

relevant results and theoretical developments
of science and research

11

2021
issue 1

AD ALTA

Journal of Interdisciplinary Research

AD ALTA: Journal of Interdisciplinary Research

Double-Blind Peer-Reviewed

Volume 11, Issue 1, 2021

Number of issues per year: 2

© The Authors (June, 2021)

MAGNANIMITAS Assn.

AD ALTA: JOURNAL OF INTERDISCIPLINARY RESEARCH

© 2021 MAGNANIMITAS, ATTN. AND/OR ITS LICENSORS AND AFFILIATES (COLLECTIVELY, "MAGNANIMITAS"). ALL RIGHTS RESERVED.

JOURNAL NO.: 11/01 (VOLUME 10, ISSUE 1), JUNE, 2021

ADDRESS: CESKOSLOVENSKE ARMADY 300, 500 03, HRADEC KRALOVE, THE CZECH REPUBLIC, TEL.: 498 651 292, EMAIL: INFO@MAGNANIMITAS.CZ

ISSN 1804-7890, ISSN 2464-6733 (ONLINE)

AD ALTA IS A PEER-REVIEWED JOURNAL OF INTERNATIONAL SCOPE.

2 ISSUES PER VOLUME.

AD ALTA: JOURNAL OF INTERDISCIPLINARY RESEARCH USES THE RIV BRANCH GROUPS AND BRANCHES, BUT THE JOURNAL IS NOT A PART OF RIV. THE RIV IS ONE OF PARTS OF THE R&D INFORMATION SYSTEM. THE RIV HAS COLLECTED AN INFORMATION ABOUT RESULTS OF R&D LONG-TERM INTENTIONS AND R&D PROJECTS SUPPORTED BY DIFFERENT STATE AND OTHER PUBLIC BUDGETS, ACCORDING TO THE R&D ACT [CODE NUMBER 130/2002], THE CZECH REPUBLIC.

A	SOCIAL SCIENCES
B	PHYSICS AND MATHEMATICS
C	CHEMISTRY
D	EARTH SCIENCE
E	BIOLOGICAL SCIENCES
F	MEDICAL SCIENCES
G	AGRICULTURE
I	INFORMATICS
J	INDUSTRY
K	MILITARISM

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MAGNANIMITAS'S PRIOR WRITTEN CONSENT. ALL INFORMATION CONTAINED HEREIN IS OBTAINED BY MAGNANIMITAS FROM SOURCES BELIEVED BY IT TO BE ACCURATE AND RELIABLE. BECAUSE OF THE POSSIBILITY OF HUMAN OR MECHANICAL ERROR AS WELL AS OTHER FACTORS, HOWEVER, ALL INFORMATION CONTAINED HEREIN IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND. UNDER NO CIRCUMSTANCES SHALL MAGNANIMITAS HAVE ANY LIABILITY TO ANY PERSON OR ENTITY FOR (A) ANY LOSS OR DAMAGE IN WHOLE OR IN PART CAUSED BY, RESULTING FROM, OR RELATING TO, ANY ERROR (NEGLIGENT OR OTHERWISE) OR OTHER CIRCUMSTANCE OR CONTINGENCY WITHIN OR OUTSIDE THE CONTROL OF MAGNANIMITAS OR ANY OF ITS DIRECTORS, OFFICERS, EMPLOYEES OR AGENTS IN CONNECTION WITH THE PROCUREMENT, COLLECTION, COMPILATION, ANALYSIS, INTERPRETATION, COMMUNICATION, PUBLICATION OR DELIVERY OF ANY SUCH INFORMATION, OR (B) ANY DIRECT, INDIRECT, SPECIAL, CONSEQUENTIAL, COMPENSATORY OR INCIDENTAL DAMAGES WHATSOEVER (INCLUDING WITHOUT LIMITATION, LOST PROFITS), EVEN IF MAGNANIMITAS IS ADVISED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES, RESULTING FROM THE USE OF OR INABILITY TO USE, ANY SUCH INFORMATION.

PAPERS PUBLISHED IN THE JOURNAL EXPRESS THE VIEWPOINTS OF INDEPENDENT AUTHORS.

TABLE OF CONTENTS (BY BRANCH GROUPS)

A SOCIAL SCIENCES

ANALYSIS OF DEMAND FOR COUNSELLING SERVICES FOR UNIVERSITY / COLLEGE STUDENTS PETR ADAMEC, DITA JANDERKOVÁ	8
LEGAL AND INDIVIDUAL REGULATION OF SURROGACY: INTERDISCIPLINARY COMPARATIVE RESEARCH OF THE PHENOMENON MARINA RYAZANOVA, SERGEY BARYSHEV, GUZEL TUKTAROVA, OLGA AKSYONOVA, GULNARA AKHMETZYANOVA, ALSU KARIMULLINA, ELENA KOVALKOVA, DIANA ZDUNOVA	15
PECULIARITIES OF FINANCIAL REGULATION: IDENTIFICATION AND SEIZURE OF CRIMINAL PROPERTY JANA ŠIMONOVÁ, JOZEF ČENTÉŠ, ANDREJ BELEŠ	18
COMMUTING TO WORK VERSUS E-COMMUTING: DATA FROM AN AUSTRIAN COMPANY IN PRE-COVID-19 ERA, DURING 1ST LOCKDOWN, AFTER EASING AND DURING 2ND LOCKDOWN MICHAL BEŇO	25
INFLUENCE OF SOCIAL MEDIA ON THE EFFECTIVENESS OF PUBLIC HEALTH CAMPAIGNS AGAINST THE SPREAD OF COVID-19 HASAN BEYARI	32
NON-MUSICAL MARKERS OF THE STRUCTURE AND CONTENT OF MUSICAL WORKS AT THE END OF THE 20TH CENTURY BOGDAN SIUTA, IRYNA DOVHALYUK, OLENA MARKOVA, IRYNA ZINKIV, ULIANA HRAB	37
PUBLIC OPINION ON UNIFIED TV CONTENT RATING SYSTEM ANDREJ BRNÍK, GRACOVÁ SLÁVA, GRACA MARTIN	42
WEB ANALYTICS AS A TOOL FOR MONITORING STUDY PROCESS OF HIGH SCHOOL ONLINE COURSE MICHAL ČERNÝ	50
ELECTROACOUSTIC MUSIC AND THE SLOVAK MUSICAL AVANT-GARDE IN THE 1960S ALENA ČIERNA	59
SYMPTOMS OF EATING DISORDERS IN YOUNG WOMEN WITH AND WITHOUT SELF-HARMING BEHAVIOUR DOMINIKA DOKTOROVA, SLAVKA DEMUTHOVA	65
PSYCHOLINGUISTIC ASPECTS OF FORMATION OF ENGLISH INNOVATIVE CONCEPTS IN THE SPHERE OF PARENTING, BASED ON THE FEELING OF PARENTAL GUILT OLENA LEONIDIVNA GARMASH, OLGA VICTORIVNA TSARKOVA	70
THE IMPACT OF MACROECONOMIC INDICATORS ON VAT REVENUES IN EU COUNTRIES ALENA ANDREJOVSKÁ, MARTINA HELCMANOVSKÁ	78
FRAGMENTS OF JUDAISM IN THE MEMOIR LITERATURE OF EASTERN SLOVAKIA SYLVIA HREŠKOVÁ	86
EARLY INTERVENTION AS A FUNDAMENTAL ASPECT FOR THE PREPAREDNESS OF CHILDREN WITH SPECIAL LEARNING NEEDS INTO THE EDUCATION ENVIRONMENT ANNA HUDECOVÁ, STANISLAV BENČIČ, JANA HRČOVÁ, MARTINA MAGOVÁ	93
E-PANOPTICON OF FACE-TO-DISPLAY WORKERS: FROM THE OFFICE TO THE HOME MICHAL BEŇO, JOZEF HVORECKÝ, JOZEF ŠIMÚTH	97
REGIONAL DIFFERENCES IN THE CONTEXT OF LABOR MIGRATION IN THE HEALTH SECTOR SIMONA HYŽOVÁ, MAGDALÉNA TUPÁ	106
IMPLEMENTING NEW TRENDS NOT ONLY IN PERSONNEL COMMUNICATION WITH SCARCE PROFESSIONS ON LABOUR MARKET IN THE CONTEXT OF TECHNOLOGY INTERFERENCE JAROSLAV BEDNÁRIK, JANA CHARVÁT JANECHOVÁ	110
UTILIZATION OF MODERN METHODS IN MEASURING THE FINANCIAL PERFORMANCE OF THE COMPANY ANNA JACKOVÁ	114

SOVIET LAW AND THE NATIONALISATION OF CHURCH PROPERTY ON THE EXAMPLE OF THE LVIV SEMINARY DURING THE SOVIET AND GERMAN OCCUPATION OF 1939-1945 PAVLO KHOMIAK, LYUDMYLA STRILCHUK	117
MODERNIZATION OF THE EDUCATIONAL CONTENT OF IT SUBJECTS: WHAT IS, IN FACT, THE LEVEL OF KNOWLEDGE AND INTEREST IN IT-ORIENTED TOPICS IN PRIMARY SCHOOL PUPILS? MILAN KLEMENT	120
REVENUE EFFICIENCY IN THE CZECH REPUBLIC AND SLOVAKIA KRISTINA KOCISOVA, PETER SUGEREK	130
EDUCATIONAL CONSTRUCT OF NATURAL AND SOCIAL REALIA IN 2ND GRADE OF ELEMENTARY SCHOOL WITH AN EMPHASIS ON ENVIRONMENTAL EDUCATION: A COMPARISON OF THE SLOVAK AND CZECH MODEL DANA KOLLÁROVA, EVA HEGAROVÁ, ALEXANDRA NAGYOVÁ	138
ADAPTATION OF UNIVERSITY STUDENTS OF DIFFERENT AGE GROUPS TO THE CONDITIONS OF EDUCATION NINA KOZÁROVÁ, JURAJ KOMORA	145
MODIFICATION OF THE COMPARATIVE VALUATION METHOD FOR VALUATION OF A SET OF REAL ESTATE WITH AN INSUFFICIENTLY LARGE BATTERY OF COMPARABLE PROPERTY TOMÁŠ KRULICKÝ, MAREK VOCHOZKA	150
ORIGINS OF MEDICAL EDUCATION ON THE TERRITORY OF MODERN UKRAINE ALLA KULICHENKO, MARYNA BOICHENKO	157
BEST PRACTICES FOR IMPROVING SPATIAL IMAGINATION IN MATHEMATICS ZUZANA NAGYOVÁ LEHOCKÁ, ANTAL CSÁKY RASTISLAV ŽITNÝ	162
FACILITATING VISUAL LITERACY IN FOREIGN LANGUAGE LEARNING IVICA KOLEČÁNI LENČOVÁ	167
IMPACT OF WORKING ENVIRONMENT ON STUDENT LEARNING DANKA LUKÁČOVÁ, GABRIEL BÁNESZ, IVANA TUREKOVÁ	172
PLURILINGUAL APPROACH IN FOREIGN LANGUAGE TEACHING AND FOREIGN LANGUAGE TEACHER EDUCATION IN SLOVAKIA FROM THE INTERDISCIPLINARY POINT OF VIEW IVICA KOLEČÁNI LENČOVÁ, MAREK LUPTÁK	176
LABOR MARKET COMPARISON IN THE CONTEXT OF REGIONAL DISPARITIES IN THE SLOVAK REPUBLIC JANA MASÁROVÁ, EVA KOIŠOVÁ, JOZEF HABÁNIK	181
UKRAINE'S NATIONAL SECURITY POLITICAL AND LEGAL SUPPORT UNDER DEMOCRATIC TRANSITION CONDITIONS ANDRIY DATSYUK, RENA MARUTYAN, YURIY MELNYK	187
COMPARISON OF PHYSICAL ABILITY AND PHYSICAL PERFORMANCE OF CHILDREN IN PRIMARY EDUCATION MARIÁN MERICA, RÓBERT OSAĐAN, VIKTÓRIA KOVÁČOVÁ	193
SUSTAINABLE MENTAL MOBILITY FOR PROFESSIONAL LEADERSHIP IN SECURITY ENVIRONMENT EVA AMBROZOVÁ, DAVID ULLRICH, JIŘÍ KOLEŇÁK, PAVEL SLÁDEK, JAN ZEŽULA, FRANTIŠEK MILICHOVSKÝ	203
MULTIMODAL ASPECTS OF THE BANSKÁ BYSTRICA LINGUISTIC LANDSCAPE MOLNÁROVÁ EVA	209
RELATION BETWEEN THE IMPLEMENTATION FREQUENCY OF REFLEXIVE METHODS AND SELF-EFFICACY OF LOWER SECONDARY SCHOOL TEACHERS MICHAL NOVOCKÝ, LENKA ROVNÁNOVÁ	214
OPTIONS OF ADDRESSING POWER SUPPLY DISRUPTION IN THE CONDITIONS OF THE CZECH REPUBLIC: A CASE STUDY STEPAN KAVAN, ALENA OULEHLOVA	223
CHANGES IN CORPORATE STRATEGIES AND CONSUMER BEHAVIOR CAUSED BY COVID-19 AFFECTING MARKETING COMMUNICATIONS AND THEIR TOOLS ALENA KUSÁ, LADISLAV PÁTÍK	231
TEACHING DURING THE PANDEMIC IN HIGHER EDUCATION: AN ONLINE DRAMA COURSE FOR TEACHER TRAINEES OF ENGLISH AS A FOREIGN LANGUAGE ANDREA PUSKÁS	239

INFLUENCE OF THE SOCIAL COMPETENCE TRAINING ON PERSONALITY VARIABLES LUCIA RAPSOVÁ	245
INTENSITY OF INNOVATION ACTIVITY AND ITS PROGRESSIVITY IN ENTERPRISES IN SLOVAKIA IN THE ERA OF INDUSTRY 4.0 PATRIK RICHNÁK	250
STUDENTS PERSONALITY DEVELOPMENT THROUGH INDIVIDUAL ACTION RESEARCH BOHDANA RICHTEROVÁ, BARBARA NEDVÍDKOVÁ	255
COPING STRATEGIES AND MENTAL TOUGHNESS IN SPORTS SCHOOL STUDENTS MARTINA ROMANOVÁ	260
COMMUNICATION ASPECTS IN THE FRAMEWORK OF SMALL AND MEDIUM-SIZED ENTERPRISES AND PUBLIC ADMINISTRATION BODIES IN THE REGION DENISA JÁNOŠOVÁ, RENÁTA SÁDECKÁ, LENKA LABUDOVÁ	265
THE EFFECT OF THE FIRST WAVE OF THE COVID-19 GLOBAL PANDEMIC ON SUMMER HOLIDAY PLANS IN 2020 – CASE STUDY FROM THE CZECH REPUBLIC NIKOLA SAGAPOVA, RADIM DUŠEK	271
THE ART OF TOURISM MARKETING AS A WAY TO A SUSTAINABLE RESTART AFTER THE PANDEMIC JARMILA ŠALGOVIČOVÁ, DENISA JÁNOŠOVÁ, TAMÁS DARÁZS, RENÁTA SÁDECKÁ	278
POSITIONAL EMPHASIS IN THE MODERN LITERARY TEXT SVITLANA HALAUR, RUSLANA SHRAMKO, SVITLANA PEDCHENKO	287
TRENDS IN STRATEGIC HUMAN RESOURCE MANAGEMENT: EMPLOYER BRAND ATTRACTIVENESS RENATA SKÝPALOVÁ, MONIKA VENCOUROVÁ, VENDULA HYNKOVÁ	292
THE SPECIFIC SUITABLE METHODS FOR DEVELOPING OF PSYCHOPHYSICAL FITNESS AND DECISION-MAKING SKILLS OF MANAGERS PAVEL SLÁDEK, DAVID ULLRICH, VERONIKA LACINOVÁ, FRANTIŠEK MILICHOVSKÝ	298
SALE AND VALUATION OF A PART OF A BUSINESS UNIT IN THE IDENTIFICATION OF OPERATING ASSETS PETR ŠULEŘ, JAKUB HORÁK, ZUZANA ROWLAND	303
INFLUENCE OF THE CORONAVIRUS PANDEMIC ON SOCIAL PROCESSES IN RUSSIA GENNADI B. PRONCHEV, VALENTINA A. SUSHKO	310
OPTIONS OF LEARNING PROCESS OF TEACHING SUBJECT INFORMATION SOCIETY KATARÍNA SZARKA, ISTVÁN SZŐKÖL	316
INTRODUCTION OF MODULAR AND ADAPTIVE TEACHING OF INFORMATION AND COMMUNICATION TECHNOLOGIES ISTVÁN SZŐKÖL, LUCIA KRIŠTOFIKOVÁ	322
FORUM THEATRE AND THE TEACHING PROCESS LADISLAV TISCHLER	328
STRESS AS A RISK FACTOR IN THE FIREFIGHTER PROFESSION MICHAELA BALÁŽIKOVÁ, MARIANNA TOMAŠKOVÁ, JIŘÍ POKORNÝ	331
VISUAL VS. TEXTUAL PROGRAMMING: A CASE STUDY ON MOBILE APPLICATION PROGRAMMING BY TEENAGERS TOMÁŠ TÓTH, GABRIELA LOVÁSZOVÁ	337
LEAVE OF PARENTS WITH EMPLOYEE STATUS IN THE CONTEXT OF EUROPEAN LEGISLATION SILVIA TRELOVÁ	348
SOCIAL WORK AS A TOOL FOR ANOMIE CORRECTION ON SECOND STAGE OF PRIMARY SCHOOL MIROSLAV TVRDOŇ, PETER KONDRLA, LUCIA MESÁROŠOVÁ	353
PREDICTION OF STOCK INDICES USING ARTIFICIAL NEURAL NETWORKS AND TECHNICAL INDICATORS MARTA URBANÍKOVÁ, MICHAELA ŠTUBŇOVÁ, JARMILA HUDÁKOVÁ, VIERA PAPCUNOVÁ	358
ENSURING THE RIGHTS AND LEGITIMATE INTERESTS OF CHILDREN AS PARTICIPANTS IN PUBLIC RELATIONS MYKOLA VESELOV, TETIANA REKUNENKO, RUSLAN PYLYPIV, NATALIA KHMELEVSKA, MYKHAILO KOROL	365
IMAGE IN NON-ARTISTIC TEXT AS A FACTOR DEVELOPING READING STRATEGIES OF SECONDARY TECHNICAL SCHOOLS' PUPILS DANA VICHERKOVÁ, MARKÉTA ŠENKEŘÍKOVÁ, DENISA LICHÁ	369

IMPACT OF BREXIT ON RETURN MIGRATION TO THE SLOVAK REPUBLIC SERGEJ VOJTOVIČ, NATÁLIA LETKOVÁ, JÚLIA KOSTROVÁ	374
INTERNATIONAL INFORMATION SECURITY YEVHENIJA VOZNYUK, MYKHAYLO KUNYTSKYI, NAZAR MYKHALIUK, OLEKSANDR NOVAK	381
WHAT IS THE PRICE OF OUTDOOR ADVERTISING: A CASE STUDY OF THE CZECH REPUBLIC? JAROSLAV ZAHŘÁDKA, VERONIKA MACHOVÁ, JIŘÍ KUČERA	386
DOES THE IMPLEMENTATION OF LOYALTY PROGRAMMES LEAD TO GAINING A LOYAL CUSTOMER? MICHAELA ŽILINSKÁ, JAROMÍR VRBKA, EVA KALINOVÁ	392

D EARTH SCIENCES

TEACHING GEOGRAPHICAL METHODS AND FORMS IN THE UNITED STATES, ICELAND AND SLOVAKIA LUCIA PETRIKOVIČOVÁ, SIMONA DYSKOVÁ, MARTINA PAVLÍKOVÁ, DINARA GINIYATULLOVNA VASBIEVA, OLGA ANATOLEVNA KALUGINA	398
THE GROWTH OF TOURISM AND ITS IMPACT ON THE PROTECTED AREAS OF ICELAND SIMONA DYSKOVÁ, LUCIA PETRIKOVIČOVÁ, MARIE ROUBALOVÁ	402

F MEDICAL SCIENCES

SAOHEALTH 4.0: IMPLEMENTATION BARRIERS IN SLOVAKIA MAGDALÉNA TUPÁ, SIMONA HYŽOVÁ	409
--	-----

I INFORMATICS

MODELLING OF AN INTELLIGENT TRAFFIC CONTROL SYSTEM AMINAH HARDWAN AHMED, LUCA ZANOTTI FRAGONARA	416
---	-----

J INDUSTRY

STRENGTH CALCULATION OF FIXED JOINTS APPLIED IN PASSENGER CARS SILVIA MALÁKOVÁ, SAMUEL SIVÁK, ANNA GUZANOVÁ, ROBERT GREGA	423
---	-----



A SOCIAL SCIENCES

AA	PHILOSOPHY AND RELIGION
AB	HISTORY
AC	ARCHAEOLOGY, ANTHROPOLOGY, ETHNOLOGY
AD	POLITICAL SCIENCES
AE	MANAGEMENT, ADMINISTRATION AND CLERICAL WORK
AF	DOCUMENTATION, LIBRARIANSHIP, WORK WITH INFORMATION
AG	LEGAL SCIENCES
AH	ECONOMICS
AI	LINGUISTICS
AJ	LITERATURE, MASS MEDIA, AUDIO-VISUAL ACTIVITIES
AK	SPORT AND LEISURE TIME ACTIVITIES
AL	ART, ARCHITECTURE, CULTURAL HERITAGE
AM	PEDAGOGY AND EDUCATION
AN	PSYCHOLOGY
AO	SOCIOLOGY, DEMOGRAPHY
AP	MUNICIPAL, REGIONAL AND TRANSPORTATION PLANNING
AQ	SAFETY AND HEALTH PROTECTION, SAFETY IN OPERATING MACHINERY

ANALYSIS OF DEMAND FOR COUNSELLING SERVICES FOR UNIVERSITY / COLLEGE STUDENTS

^aPETR ADAMEC, ^bDITA JANDERKOVÁ

*Institute of Lifelong Learning, Mendel University in Brno
Zemědělská 5, 613 00 Brno, the Czech Republic*

email: ^apetr.adamec@mendelu.cz, ^bdita.janderkova@mendelu.cz

The questionnaire was designed as a part of activities carried out within the OP RDE project "Competitive Graduate of Mendel University in Brno," reg. No. CZ.02.2.69/0.0/0.0/16_015/0002365.

Abstract: The offer for counselling services at universities and colleges is nowadays their standard component. University counselling focuses on learning, psychological, social, special-pedagogical and career issues. The aim of the paper is to acquaint with the results of the demand analysis for counselling services among students of all grades of the selected university in the Czech Republic. The results identified specific areas where students would need guidance or their further development (e. g. soft skills) while gender and student preference differences at different stages of study were found for most indicators. The results of such investigations are the core basis for reflection, innovation and improvement of the university counselling services status quo.

Keywords: counselling, issues, services, students, university

1 Counselling services at universities – general background

University studies bring about many positive aspects, such as new knowledge, skills, acquired and further developed competences, new social relationships, getting to know new places, gaining autonomy, independence, emotional disengagement from family and many others. On the other hand, university studies also mean a big change in an individual's life. This change is even greater if connected with the change of previous residence place or with the loss of proven and firm contacts and rituals. The young adult (in this context we will mainly be dealing with the 18 to about 35 years old age group) is taking on new roles and associated behavioural patterns. But it is not always possible to fulfil the role of a college student without problems, harmoniously, with no hitches or complications. Some people are more flexible, they can adapt faster, some people need more time, and some people get into trouble. Their psyche is unable to cope with the new challenges, and the first problems, the obstacles and then the symptoms of stress and anxiety appear. But the reason why this happens to only some people is associated with many factors. Examples include personality assumptions, past experience, intellectual capacity, the level of stress resistance, and the like (cf. Allan, McKenna, & Dominey, 2013).

The counselling services offer at universities and colleges is now their standard component. These services cover several typical and fundamental topics. University counselling focuses on learning, psychological, social or social-legal, special-pedagogical and career-related issues. Counselling services clients are not only dealt with in the form of group activities, courses, seminars but, above all, in the form of individual consultations. Although, the whole academic community (students and academics) can use the counselling services, this paper is mainly aimed at students as counselling services clients.

A young person entering a university comes with a certain image, with a certain expectation. However, the reality tends to be different, and it depends on how much different it actually is. Did they expect more changes, did they have more fears that did not finally come true, or did they underestimate the situation and thought it would be easier? All of this contributes to how the student gradually deals with the problems. Someone needs more time, someone makes more effort, someone corrects their ideas, someone gives up and someone seeks help. For example, others, like more experienced students, friends or family can help, but sometimes even that is not sufficient. And that is when the student has the opportunity to take advantage of the counselling system. In coping with these issues, it also depends on the fact whether the student studies in a full-time or in a combined form of study. These are two quite different groups, and not only the

teaching methods but also the counselling services themselves need to be adapted. Slavík et al. (2012) notes that students in the full-time form of study are mostly aged 19-25. They are at the turn of adolescence and early adulthood, and this is accompanied by a certain level of intellectual maturation, certain life and learning experiences, and sometimes also first professional experiences of a practical nature. Combined form students tend to be older than full-time students. The 30-45 age group tends to be the largest, but younger or older people are no exception. Many of them work during their studies and already have a family and children of their own. The implication is that their time and emotional load is enormous. In case they also work in the study field while studying, this needs to be considered by the educators as well, as these students already have a lot of experience, knowledge, and, moreover, a contact with the professional reality, which, with all due respect, even some academics lack. All the above-mentioned aspects can form the basis of future problems that students of both forms of study may have and the university counselling services should be able to address and respond to.

In case a person deals with some issues, whether personal, professional or with their studies, the timing and the way in which they get the appropriate help plays a very important role. There are individuals who prefer face-to-face communication in such cases, but there are also those who prefer to communicate electronically or through social networks, which are becoming a norm in young generation lives. A degree of shyness, uncertainty, a fear of consequences if a person seeks counselling services may also play a significant role. This is why the counselling services centres offer various counselling forms and contacts. Specifically, it is passive counselling (leaflets, information materials or packages either online or printed), individual face-to-face sessions, online chat, e-mail communication, telephone advice, virtual meetings through Skype or group meetings or seminars. A professional counselling services center will not refuse even someone who wants to communicate by, say, a simple letter.

2 Research focused on counselling services at different levels of schools

It is very inspiring to get acquainted with the various research results which was conducted at different levels of schools, because the personality of the student and the diagnostics and counselling in the school environment at different stages of personality development are joined vessels. The data collected from these studies then often serve as a fundamental basis for mapping the situation, they are a useful source of knowledge and a basis for many other evaluation processes. Within the Czech Republic, it is possible to find a brief overview of surveys related to counselling issues, for example in the paper Minksová (2010), in which she compiled an overview of major sociological research results conducted from the 1980s to about 2010. Although the information is relatively obsolete and it is not primarily pedagogical-oriented information source, their results can also inspire the school environment. Her overview includes 21 studies among university students, most of whom are longitudinal studies or those that are part of large-scale research projects.

Minksová (2010) points out here not only to those areas where the greatest emphasis is put on university students, but also to those that remain neglected. The first area concentrated on basic information about the students and their background. The second focused on previous and current studies and the circumstances of motivation, study choices and the admission procedure itself. Another topic was questions concerning the student's existential security, i. e. mapping their financial and housing (social) situation. The student's attitudes, opinions, ideas and aspirations were included in another area. The area related to attitudes to university reforms and views

on equal access to education, issues related to evaluation and the quality of education and study provided was not left out either. The last area focused on the students themselves, on their activities and personality. The summary of these research studies also reveals a plethora of topics in demand in counselling services. Mostly it was an area focused on building soft skills, specifically, for example, communication skills, assertiveness, negotiation skills, coaching and the like.

2.1 Counselling services at primary and secondary schools

The effectiveness of counselling for pupils and students can be assessed in a variety of ways. Key indicators may cover a reduction in mental distress, an increase in mental resilience and positive effects on academic success, such as prevention of dropping out of studies and corresponding academic results. Inspiration for the improvement of counselling services can be thus sought not only in the field of higher education counselling services, but also the surveys conducted at primary and secondary schools can be an important incentive as well.

In the USA, for example, they have extensive experience in providing counselling services. This is due to many factors - among other things, because the American population is very diverse and is characterized by the large number of nationalities that have found or are looking for a home in this country. Local studies focus on, for example, the work of school counsellors and school counselling programmes and their impact on study outcomes. The common denominator is the support of school counselling services for students in the areas of their academic development and the support of their learning. The area of social and emotional development is not neglected either. All this is to be offered by the counselling system through school counsellors at individual schools.

For example, the results of research conducted by Parzych, Donohue, Gaesser, & Chiu (2019) in three US states indicated that a higher number of school counsellors correlated with lower student absenteeism, better school performance, higher number of successful graduates, and higher enrolment rate. Based on a nationally representative data set, it was found out that more counselling services provided are significantly reflected in the study results of students and in their graduation results. The authors Goodman-Scott, Sink, Cholewa, Burgess (2018) emphasized the need to extend similar research to other variables related to the broader framework of education referred to as environmental factors.

A summary of six studies focusing on school counselling and learning outcomes (Carey & Dimmitt, 2012) also yielded other interesting results. It was found out that some school counselling activities produce concrete and measurable results and that not all school counselling activities have the same impact on students. Among other things, the attendance and discipline of students were monitored. The results showed that comprehensive school counselling programmes improve a number of students' learning and behavioural outcomes.

An interesting study by Wilkerson, Perusse, & Hughes (2013) provided strong evidence that primary schools with comprehensive counselling programmes perform better academically than schools without such counselling programmes. The role of counsellors working in schools in areas with high poverty rate has been followed, for example, by studies by Lapan, Gysbers, Bragg and Pierce (2012). It was found out that there is a positive correlation between a higher number of school counsellors and better school-leaving results, better school attendance and a lower number of disciplinary offenses.

Some studies conducted in the United States have also focused on the successful integration of students with their own or family immigrant history and a language barrier. Examples include studies on the success of students of Latin American descent (Leon, Villares, Brigman, Webb, & Peluso, 2011). These researchers found out that school counselling designed

to be culturally and linguistically appropriate can significantly reduce the gap in outcomes between Latin American students with limited English and other students.

2.2 Counselling services and the counsellor's personality as a means of social development

Interesting studies are focused on the student's personality. As mentioned above, the results of the surveys confirmed that school counsellors can help students already in primary school to increase their knowledge of occupations, increase their desire to continue in post-secondary education. It was also found out how students are prepared to study at universities. Counsellors also help pupils and students to learn more about themselves, about possible fields of their further education, individual occupations and the world of work in general. Mostly, these surveys were conducted on samples of students attending schools who participated in projects aimed at increasing the academic success of students (cf. Mariani, Berger, Koerner, Sandlin (2016).

There are differences between the results of individual and group counselling. Surprisingly, the individual counselling was less effective and group counselling interventions proved more effective. Summarizing the results of their study, Whiston and Quinby (2009) found out that school counselling interventions had relatively large effects in solving problems and increasing professional knowledge and academic outcomes, as well as students' academic and personal social outcomes. Last, but not least, the relationship between school counsellors, students, parents and other stakeholders has also been explored (e.g., Kayler & Sherman, 2009).

Investigations focused on the influence of counselling services on the social-emotional characteristics and development of students' social skills can also be found in the scholarly literature. It was found out that not only the cognitive abilities, but also social and personality characteristics or mental health are responsible for success in education. Specifically, for example, how to improve attitudes to learning, strengthen self-confidence in relation to the academic results. Attention was also paid to the question of the role played by small social groups. The results showed that small group interventions were more effective than whole-class interventions (Steen, Liu, Shi, Rose, & Merino, 2018). Studies have not forgotten the role of the family, for example, in relation to managing aggression and attention problems (Amatea, Thompson, Rankin-Clemons, & Ettinger, 2010). It has also been found that counselling intervention in students can play a positive role in the early identification and prevention of depressive symptoms and suicidal thoughts (Erickson & Abel, 2013).

The effectiveness of counselling interventions is important in an era of evidence-based practices. Examples of evidence-based counselling programmes rooted in humanistic theories can be cited, such as a meta-analysis by Villares, Lemberger, Brigman and Webb (2011), the results of which demonstrate the importance of integrating human capital into school by teaching students' basic educational skills as a counselling and student outcomes.

For some researchers, the person of a school counsellor who works specifically with students with lower social capital was also interesting. For example, high school students who visited their school counsellor for information about the university were found to be more likely to enrol in college, and the increase in the number of high school counsellors in schools alone increased the likelihood that students would enrol in college. The school counsellor also had a positive effect on the reduced incidence of behavioural disorders. Overall, it has been confirmed that a school counsellor is a positive factor that is able to reduce the incidence of behavioural disorders, help students and thus improve their current and especially future careers and employability in the labour market.

2.3 Counselling services related to the university environment

One of the interesting areas is the readiness of students to study at universities and for professional careers. Research studies look, for example, at the influence of counsellors on students' thinking about higher education. The results show that counsellors can play a crucial role, not only providing information through contact, but are able to act as significant influencers of students' thinking in further education (Cholewa, Burkhardt and Hull, 2015). Among other things, student contact with counsellors has been found to affect the number of students enrolled in colleges (Bryan, Moore-Thomas, Day-Vines, Holcomb-McCoy (2011) or Hurwitz, Howell (2014). School counsellors thus play a very important role in the preparation for university studies and especially in its selection.

The presence of comprehensive school counsellors is associated with a number of positive student outcomes - from better attendance to a stronger sense of connection with school and a tendency towards further education, improved learning outcomes, behaviour and mental health. Researchers Watkinson, & Hersi (2014) sought to find specific characteristics of students seeking professional school counsellors to obtain information about the college. From a methodological point of view, it is worth mentioning that case studies were used. The wide thematic range of this issue is also confirmed by studies carried out with the help of the Delphi method, which examined the role of school counsellors in providing counselling in the field of university readiness for students with autism spectrum disorders (Krell, & Perusse, 2012).

In general, in the context of the above, it can be stated that students who have access to school counsellors and comprehensive school counselling programmes are more likely to have academic and behavioural success in school. A good example is provided by studies that found out how students using counselling services in high school and whether they then look for them in college. Counselling activities have helped students learn more informed decisions (eg, Lapan, Poynton, Balkin, Jones, 2019). The topic of transition to university and subsequent successful employment is also addressed by other studies, e.g., Lapan, Whitcomb, & Aleman, 2012; Pham & Keenan, 2011, Bryan, Holcomb-McCoy, Moore-Thomas, & Day-Vines, 2009; Militello, Carey, Dimmitt, Lee, & Schweid, 2009.

The topic of counselling at the university itself is the subject of many studies. For example, McKenzie, Murray & Richelieu (2015) examined the effectiveness of university counselling for students with academic problems. It has been shown that, although the lives of university students are associated with significant stressors, there is little data on the extent to which clients of student counselling services encounter difficulties related to academic issues and how effective counselling is for them. The aim of this survey was to evaluate the degree of effectiveness, reliability and significance of changes in students with academic problems after using counselling services. The reason for conducting more detailed research in this area was the preliminary research, which found that 92% of students face some academic problems. At the same time, counselling services were found to lead to reliable changes in 67% of students who report academic problems. It can therefore be stated that counselling services have led to reliable changes in a high percentage of those who have these difficulties.

3 Survey methodology

The Counselling Centre of Mendel University in Brno (hereinafter MENDELU), whose activities are the subject of this article, was established in January 2008 and is part of the Institute of Lifelong Learning of the mentioned university. Counselling services are provided here to students, employees, applicants, graduates and the public. Working with potential future students is very important in terms of their decision-making process. If a high school student or a working person

decides for a given university, he or she has a more realistic view of what awaits them, thanks to communication with counsellors. The Counselling Centre regularly informs students about its activities, mainly through information e-mails. This non-violent form of mediating information proves itself in the so-called first line, especially at the beginning of the academic year. Of course, applicants with specific needs who have some form of disability or disadvantage will also find help. They will get acquainted with information on considering the specific need in the study, which the university guarantees (for more see, for example, Adamec, Janderková, 2020).

3.1 Survey objectives and respondents' structure

The aim of the survey focused on the demand for counselling services was to improve the focus of counselling services of the Counselling Centre according to the current needs of students. The survey was conducted through an online questionnaire and was distributed to the email addresses of public university students. The questionnaire contained 10 questions, but a total of 70 survey features. Due to the use of the quantitative method, the respondents' answers were evaluated using software SPSS for mass data analysis. The free answers of the respondents were categorized. A total of 197 completed questionnaires were worked on. In the following text, the answers are presented in the form of tables, the relative frequencies of individual variants of answers (%) and the outputs from the classification of the second level are commented, mostly in the form of textual comments on the differences found. At least a 10% difference between the groups was considered significant.

Tab. 1: Respondents' structure

Indicator	Characteristic	Absolute Frequency	Relative Frequency
Sex	Male	60	30.5%
	Female	137	69.5%
Study Degree	Bachelor (B.Sc./B.A.)	161	81.7%
	Follow-up Master (M.Sc.)	28	14.2%
	Doctoral (Ph.D.)	8	4.1%
Study Form	Full-time	176	89.3%
	Combined	21	10.7%

Source: Author's own work.

The aim of the survey was to find answers to the following questions:

1. What is the level of awareness of the existence of the Counselling Center?
2. What difficulties do students most often encounter during their studies?
3. Which areas make their study the most difficult for students?
4. What form of counselling do students prefer for solving their difficulties or personal development?
5. Which area of counselling would students currently want to use for themselves?
6. What information or services would students appreciate for their personal development during their studies?
7. To what extent do students' opinions differ according to gender, degree and form of study?

4 Survey results

In the survey introduction, the respondents were asked if they knew about the existence of the MENDELU Counselling Centre (hereinafter PPC). The answers showed that more than four-fifths of respondents know PPC (85.8%). The level of awareness of existence was compared in relation to selected indicators and the results are shown in the following Table 2. The results of analyses show that the level of awareness increases with the degree, while at the bachelor's degree PPC knows approximately every eighth respondent (83.9%), all respondents

already knew about the existence of PPC at the doctoral study (100%). The results also show a higher level of awareness among respondents with full-time study compared to the combined form (87.5% vs. 71.4%).

Tab. 2: Level of Awareness of the Counselling Centre

Indicator	Characteristic	Yes	No
Sex	Male	83.3%	16.7%
	Female	86.9%	13.1%
Study Degree	B.Sc.	83.9%	16.1%
	M.Sc.	92.9%	7.1%
	Ph.D.	100.0%	0.0%
Study Form	Full-time	87.5%	12.5%
	Combined	71.4%	28.6%

Source: Author's own work.

Subsequently, a set of questions identified the difficulties that respondents encounter during their studies. Respondents were asked to indicate on a scale from "definitely yes" (1) to "definitely no" (4) whether they encountered the problem during their studies.

The results of the analyses show that the most common problem for three quarters of respondents (74.6%)¹ is procrastination (tasks postponement), furthermore, the amount of curriculum (71.0%) and the comprehensibility of the curriculum (59.9%). In contrast, respondents are the least likely to encounter learning difficulties associated with their disability (8.1%).

Tab. 3: What difficulties do you encounter most often during your studies?

	Definitely yes	Rather yes	Rather no	Definitely no	Average
Procrastination (tasks postponement)	41.1%	33.5%	22.9%	2.5%	1.87
Curriculum amount	28.4%	42.6%	27.5%	1.5%	2.02
Curriculum comprehensibility	21.8%	38.1%	37.1%	3.0%	2.21
Level of study difficulty	15.2%	44.2%	33.0%	7.6%	2.33
Time management	19.3%	38.1%	36.0%	6.6%	2.30
Perfectionism, high performance pressure	17.3%	32.5%	41.6%	8.6%	2.42
Inappropriate learning style I use	14.2%	33.5%	45.7%	6.6%	2.45
Transition from secondary to high school	10.7%	18.3%	39.5%	31.5%	2.92
Difficulties to complete my studies	6.1%	16.2%	47.7%	30.0%	3.02
Studying does not make sense to me	8.1%	13.7%	38.6%	39.6%	3.10
Inappropriate study field choice	7.1%	11.2%	42.1%	39.6%	3.14
Study difficulties related to my disability	2.5%	5.6%	16.2%	75.7%	3.65

Source: Author's own work.

The results are given in detail in Table 3 above. The difficulties in the table are ranked according to the sum of the relative frequencies of the "definitely yes" and "rather yes" variants from the highest to the lowest. The table also includes the average values of answers for individual problems, the lower the value,

the more often the respondents stated that they encounter a problem during their study.

The individual difficulties were further compared in relation to selected indicators. The results of the analyses showed that women more often feel the inappropriate choice of field of study (21.9% vs. 10.0%) and men are more faced with the problem of transition from high school to university (36.7% vs. 25.5%). In terms of the degree², bachelor's degree respondents, compared to respondents at the subsequent master's degree, report greater problems with the amount of curriculum (74.5% vs. 57.1%) and with procrastination (75.8% vs. 64.3%). Respondents from the follow-up master's degree study more often mentioned a problem with an inappropriate learning style as they learn (60.7% vs. 44.7%). In terms of the form of study, respondents from full-time study, compared to respondents from the combined form of study, face more problems with the curriculum comprehensibility (61.9% vs. 42.9%), with an inappropriate learning style as they learn (48.9% vs. 38.1%), with procrastination (76.7% vs. 57.1%), with time management (58.5% vs. 47.6%), with inappropriate choice of field of study (19.9% vs. 4.8%) and the fact that the study does not make sense to them (24.4% vs. 0.0%).

Using another battery of questions, areas that complicate the study of respondents were identified. Respondents for each area answered on a scale from "definitely yes" (1) to "definitely no" (4). The results of the analyses show that stress complicates the studies to most respondents (76.7%),³ followed by exhaustion (55.3%) and decision-making (51.8%). In contrast, peer relationships (9.7%) and addictions, eating disorders (alcohol, excessive computer use, etc.) (11.7%) are the least complicating areas for approximately one tenth of respondents.

The results are presented in detail in the following Table 4. The areas of complications are sorted in the table according to the sum of the relative frequencies of the variants "definitely yes" and "rather yes" from the highest to the lowest. The table also includes the average values of answers for individual areas, the lower the value, the more often the respondents stated that the area complicates their studies.

Individual areas complicating the study were further compared in relation to selected indicators. The results of the analyses showed that women, more often than men, stated that stress complicates their studies (82.5% vs. 63.3%), furthermore, anxiety, depression (48.9% vs. 30.0%), exhaustion (61.3% vs. 41.7%), psychosomatic difficulties (25.5% vs. 13.3%), emotional problems (40.1% vs. 15.0%) and decision-making (56.9% vs. 40.0%). In terms of the degree of study⁴, bachelor's respondents, in comparison with respondents at the subsequent master's degree, state that exhaustion (57.1% vs. 39.3%) and decision-making (55.3% vs. 32.1%) complicate their studies more. In terms of the form of study, respondents from full-time study, compared to respondents from the combined form of studies, state that their studies is more complicated by relationships with teaching authorities (19.3% vs. 0.0%), stress (78.4% vs. 61, 9%) and lack of funding (22.7% vs. 9.5%). In contrast, respondents from the combined study more often mentioned family relationships (38.1% vs. 17.6%), partnerships (33.3% vs. 18.2%) and challenging life circumstances (28.6% vs. 17, 0%).

Tab. 4: Which of the following areas make your studies the most difficult?

	Definitely yes	Rather yes	Rather no	Definitely no	Average
Stress	26.9%	49.8%	15.2%	8.1%	2.05
Exhaustion	14.7%	40.6%	33.5%	11.2%	2.41

² Due to low number of respondents, Ph.D. students were excluded from the analyses.

³ Proportion of respondents who answered „definitely yes“ or „rather yes“.

⁴ Due to low number of respondents, Ph.D. students were excluded from the analyses.

¹ Proportion of respondents who answered „definitely yes“ or „rather yes“.

Decision-making	10.7%	41.1%	33.0%	15.2%	2.53
Anxiety, depression	11.7%	31.5%	31.5%	25.3%	2.71
Low performance, efficiency	9.7%	28.9%	52.8%	8.6%	2.60
Emotional problems	9.1%	23.4%	35.0%	32.5%	2.91
Communication difficulties	10.7%	21.3%	55.8%	12.2%	2.70
Psychosomatic difficulties	7.6%	14.3%	42.1%	36.0%	3.07
Lack of funds	8.6%	12.7%	41.1%	37.6%	3.08
Family relationships	6.6%	13.2%	29.9%	50.3%	3.24
Partnerships	5.6%	14.2%	32.0%	48.2%	3.23
Challenging and traumatic life circumstances	7.1%	11.2%	32.5%	49.2%	3.24
Relations with authorities (teachers)	4.6%	12.7%	46.2%	36.5%	3.15
Addictions, eating disorders	1.5%	10.2%	24.9%	63.4%	3.50
Peer relationships	3.6%	6.1%	35.0%	55.3%	3.42

Source: Author's own work.

Subsequently, respondents were to indicate what form of counselling they prefer or would prefer for solving their problems or for their personal development (Table 5). A total of seven forms of counselling were on offer and respondents had to choose a maximum of three options. The answers of those respondents who indicated more options were excluded from the analyses. Most often, respondents prefer or would prefer individual consultations (81.6%). More than half of the respondents (54.7%) mentioned group meetings / seminars and a quarter of respondents (25.3%) prefer the e-mail form of counselling. Skype is the least suitable for respondents (5.3%).

Tab. 5: What form of counselling do you prefer or would prefer for solving your problems or for your personal development?

	Direction
Individual consultations (face-to-face)	81.6%
Group meetings / seminars	54.7%
E-mail	25.3%
Passive counselling (online or printed information materials)	19.5%
On-line chat	17.9%
Telephone counselling	7.4%
Skype	5.3%

Source: Author's own work.

The preferred form of counselling was further compared in relation to selected indicators. The results of the analyses showed that men prefer more individual consultations than women (89.5% vs. 78.2%), while women prefer group meetings/seminars more than men (57.9% vs. 47.4%). In terms of the form of study, respondents from the combined study prefer e-mail more than respondents from the full-time form of study (36.8% vs. 24.0%). On the other hand, they prefer group meetings / seminars (56.7% vs. 36.8%)⁵.

⁵ In case of study form we point out to low frequencies; the results can be considered as indicative only.

At the end of the questionnaire, areas of counselling were identified that the respondents would like to use for themselves or which they currently use. The results show that more than half of the respondents (53.8%) would like to use or already use career counselling (assurance of the chosen field, choice of follow-up studies, career building) and almost the same number of respondents (48.7%) would like to use, has already used or is using seminars, courses, workshops. Furthermore, the respondents mentioned study counselling (solving problems with the organization of the curriculum, inappropriate learning style) (34.0%) and psychological counselling (mental difficulties, relationship issues, self-confidence, emotional difficulties, coping with disability, trauma, childhood situation, search for own identity, etc.) (26.9%). The results are documented in detail in the following Table 6.

Tab. 6: Identification of the counselling areas currently being used or would be used by the respondents

	Share
Career counselling	53.8%
Seminars, courses, workshops	48.7%
Study counselling	34.0%
Psychological counselling / advice	26.9%
Coaching	24.4%
Personality diagnostics	23.9%
Nutrition counselling	21.8%
Social and legal counselling	10.2%
Support for students with specific needs	4.6%
Addictology counselling, addictions	3.6%

Source: Author's own work.

Subsequently, the required areas of counselling were compared in relation to selected indicators. The results of the analyses showed that women are more interested than men in career counselling (65.0% vs. 52.8%), in seminars, courses, workshops (60.0% vs. 45.3%) and in psychological counselling (34.2% vs. 22.6%). In terms of the degree of study⁶, bachelor's respondents are more interested in study counselling (difficulties in organizing the curriculum, inappropriate learning style, etc.) (42.0% vs. 26.1%), in nutritional counselling (25.9% vs. 13.0%). Respondents from the follow-up master's degree are more interested in career counselling (82.6% vs. 57.3%). In terms of the form of study, respondents from combined study are more interested in seminars, courses, workshops (68.4% vs. 53.9%) and coaching (36.8% vs. 26.6%) compared to respondents from the full-time form of study). In contrast, full-time respondents are more interested in career counselling (66.2% vs. 21.1%), study counselling (40.3% vs. 26.3%) and psychological counselling (31.8% vs. 21.1%)⁷.

Only half of the respondents (52.3%) answered the question "What topics of workshops, seminars and personal development courses would be of interest to you?" It was a free question, i.e., without the offered variants of answers. The individual responses were categorized and the categories of responses, including relative frequencies, are documented in the following Table 7.

Tab. 7: Topics of workshops, seminars and personal development courses of interest

Suggested workshops topics	Relative Frequencies
Communication and presentation skills, body language	20.2%
Procrastination, time management	20.2%

⁶ Due to low number of respondents, Ph.D. students were excluded from the analyses.

⁷ Due to low number of respondents, Ph.D. students were excluded from the analyses.

Stress, fear and tremor / stage fright management and self-confidence	17.2%
CVs or cover letters writing, interview preparations	16.2%
Entrepreneurship	14.1%
Future employment counselling – job opportunities in the field, where to look for a job, how to enter the labour market, company, lectures etc.	9.1%
Learning effectivity	8.1%
Meditation, peace of mind	7.1%
Professional papers / theses writing	7.1%
Personality diagnostics, self-knowledge	6.1%
Motivation	5.1%
Foreign languages, mostly English	5.1%
Microsoft Office, SAP courses	5.1%
Relationships	4.0%
Healthy lifestyle	4.0%
Others	36.3%

Source: Author's own work.

Some respondents mentioned more than one topic, so the sum of relative frequencies in the table is higher than 100%. The results show that one fifth of respondents (20.2%) are most interested in workshops, seminars and courses focusing on communication, presentation skills and body language, and for an equally large group (20.2%) on topics of procrastination and time management. Respondents are also interested in the areas of coping with stress, fear, fear and self-confidence (17.2%), writing CVs and cover letters and preparing for an interview (16.2%) and the topic of entrepreneurship (14.1%).

5 Summary and conclusion

Quality counselling must be based on the potential users of the counselling services themselves. Certainly, it would be a mistake to go the other way, when the range of services is planned by the consulting institution, and it is expected that clients will find themselves in it in some way or that they will "fit" into it. The evaluation process is the basis of the quality work of any institution. And for institutions working with human resources, simply with people (students, teachers, counsellors), this is one of the key priorities. Therefore, a questionnaire survey was conducted, the results of which are also part of this paper. After the evaluation, the data that was expected also appeared, but also even that which serves as a stimulus for reflection and possible changes.

Counselling is an important area that belongs to the activities of universities. Previously, this activity was on the fringes of interest, but the situation is changing in line with how the social atmosphere and view of a person's personality is changing - in our case, the student's. They have begun to be perceived in their integrity. The student is far from solving only the study issues, although it should be their fundamental and crucial activity. Only an individual as an integrated personality can adequately devote themselves to study and deliver quality results. It follows that the counselling services provided are not only in the interests of the students themselves, but also of the entire university and, ultimately, of society. The counselling activity carried out by individual higher education institutions is an indicator of the quality of the given institution and its results become the basis for its evaluation.

Today, we focus too much on the professional side of a person's life, we monitor their performance, achievements, career and at the same time we neglect such a fundamental part of life as private life, ways of spending free time. It is not possible to separate completely these two areas; a person with inner peace

and mental stability gives better work performance. The world needs not only super-executive works or employees, but it also needs people with emotional experiences, able to support others and support themselves. There are times when the world confronts us with unknown tasks for which we do not have patterns of behaviour, we cannot draw on experience. Then we must rely on ourselves and, if possible, seek help in our surroundings. And it is the Counselling Centre that sees its mission in this area and sees in it the meaning of its operation.

Literature:

1. Adamec, P., & Janderková, D. (2020). Evaluace poradenských služeb na veřejné vysoké škole. *Diagnostika a poradenství v pomáhajících profesích*, 4(1), 64-80. Praha: PALESTRA. ISSN 2570-7612
2. Allan, J. F., McKenna, J., & Dominey, S. (2013). Degrees of resilience: profiling psychological resilience and prospective academic achievement in university inductees. *British Journal of Guidance & Counselling*, 42(1), 9-25. doi:10.1080/03069885.2013.793784
3. Amatea, E. S., Thompson, I. A., Rankin-Clemons, L., & Ettinger, M. L. (2010). Becoming partners: A school-based group intervention for families of young children who are disruptive. *Journal of School Counseling*, 8(36). Retrieved from <http://www.jsc.montana.edu/articles/v8n36.pdf>
4. Bryan, J., Moore-Thomas, C., Day-Vines, N. L., & Holcomb-McCoy, C. (2011). School Counselors as Social Capital: The Effects of High School College Counseling on College Application Rates. *Journal of Counseling and Development*, 89(2), 190-199. doi: 10.1002/j.1556-6678.2011.tb00077.x
5. Bryan, J., Holcomb-McCoy, C., Moore-Thomas, C., & Day-Vines, N. L. (2009). Who Sees the School Counselor for College Information? A National Study. *Professional School Counseling*, 12(4), 280-291. doi: 10.1177/2156759X0901200401
6. Carey, J., & Dimmitt, C. (2012). School Counseling and Student Outcomes: Summary of Six Statewide Studies. *Professional School Counseling*, 16(2), 146-153. doi: 10.1177/2156759X0001600204
7. Erickson, A., & Abel, N. R. (2013). A High School Counselor's Leadership in Providing School-Wide Screenings for Depression and Enhancing Suicide Awareness. *Professional School Counseling*, 16(5), 283-289. doi: 10.1177/2156759X1201600501
8. Goodman-Scott, E., Sink, C., Cholewa, B., Burgess, M. (2018). An ecological view of school counselor ratios and student academic outcomes: A national investigation. *Journal of Counseling and Development*, 96(10), 388-398. doi: 10.1002/jcad.12221
9. Hurwitz, M., & Howell, J. (2014). Estimating causal impacts of school counselors with regression discontinuity designs. *Journal of Counseling & Development*, 92(3), 316-327. doi: 10.1002/j.1556-6667.2014.00159.x
10. Cholewa, B., Burkhardt, C., Hull, M. (2015). Are School Counselors Impacting Underrepresented Students' Thinking about Postsecondary Education? A Nationally Representative Study. *Professional School Counseling*, 19(1), 144-154. doi: 10.5330/1096-2409-19.1.144
11. Kayler, H., & Sherman, J. (2009). At-risk ninth-grade students: A psychoeducational group approach to increase study skills and grade point averages. *Professional School Counseling*, 12(6), 434-439. doi: 10.1177/2156759X0901200608
12. Krell, M., & Perusse, R. (2012). Providing College Readiness Counseling for Students with Autism Spectrum Disorders: A Delphi Study to Guide School Counselors. *Professional School Counseling*, 16(1), 29-39. doi: 10.1177/2156759X1201600104
13. Lapan, R., Poynton, T., Balkin, R., Jones L. (2019). *ASCA National Model Implementation and Appropriate School Counselor Ratios Promote More Informed College Decision-Making. Research report*. Retrieved from <https://asca-prod.azurewebsites.net/asca/media/asca/Publications/Effectiveness-AppRatios-ResearchReport.pdf>
14. Lapan, R. T., Gysbers, N. C., Bragg, S., & Pierce, M. E. (2012). Missouri Professional School Counselors: Ratios Matter,

- Especially in High-Poverty Schools. *Professional School Counseling*, 16(2), 108-116. doi: 10.1177/2156759X0001600207
15. Lapan, R. T., Whitcomb, S. A., & Aleman, N. M. (2012). Connecticut Professional School Counselors: College and Career Counseling Services and Smaller Ratios Benefit Students. *Professional School Counseling*, 16(2), 117-124. doi: 10.1177/2156759X0001600206
16. Leon, A., Villares, E., Brigman, G., Webb, L., & Peluso, P. (2011). Closing the gap in the success of Latin American / Latin American students: a school counseling response. *Counseling Outcome Research and Evaluation*, 2(1), 73-86. doi: 10.1177/2150137811400731
17. Mariani, M., Berger, C., Koerner, K., Sandlin, C. (2016). Operation Occupation: A College and Career Readiness Intervention for Elementary Students. *Professional School Counseling*, 20(1), 65-76. doi: 10.5330/1096-2409-20.1.65
18. McKenzie, K., Murray, K. R., Murray, A. L., & Richelieu, M. (2015). The effectiveness of university counselling for students with academic issues. *Counselling & Psychotherapy Research*, 15(4), 284-288. Retrieved from: <https://onlinelibrary.wiley.com/doi/pdf/10.1002/capr.12034>
19. Militello, M., Carey, J., Dimmitt, C., Lee, V. & Schweid, J. (2009). Identifying Exemplary School Counseling Practices in Nationally Recognized High Schools. *Journal of School Counseling*, 7(13), 1-26. Retrieved from: <http://www.jsc.montana.edu/articles/v7n13.pdf>
20. Minksová, L. (2010). Vysokoškoláci – přehled hlavních sociologických výzkumů realizovaných v ČR. *Data a výzkum – SDA Info 2010*, 4(1), 39-10. Retrieved from http://dav.soc.cas.cz/uploads/0cef0da1bacc35ea4353fd5d8eb52bb1bd9add7e_DaV10_1_s39_60.pdf
21. Parzych, J., Donohue, P., Gaesser, A., Chiu, M. (2019). Measuring the Impact of School Counselor Ratios on Student Outcomes. Retrieved from <https://www.schoolcounselor.org/getmedia/5157ef82-d2e8-4b4d-8659-a957f14b7875/Ratios-Student-Outcomes-Research-Report.pdf>
22. Pham, C., & Keenan, T. (2011). Counseling and college matriculation: Does the availability of counseling affect college-going decisions among highly qualified first-generation college-bound high school graduates? *Journal of Applied Economics and Business Research*, 1(1), 12-24. Dostupné z: http://www.aebrjournal.org/uploads/6/6/2/2/6622240/3_cp_tk_college.pdf
23. Slavík, M. (2012). *Vysokoškolská pedagogika*. Praha: Grada.
24. Steen, S., Liu, X., Shi, Q., Rose, J., Merino, G. (2018). Promoting School Adjustment for English-Language Learners Through Group Work. *Professional School Counseling*, 21(1), 1-10. doi: 10.1177/2156759X18777096
25. Villares, E., Lemberger, M., Brigman, G., & Webb, L. (2011). Student Success Skills: An evidence-based school counseling program grounded in humanistic theory. *Journal of Humanistic Counseling*, 50, 42-55. doi: 10.1002/j.2161-1939.2011.tb00105.x
26. Watkinson, J. S., & Hersi, A. A. (2014). School Counselors Supporting African Immigrant Students' Career Development: A Case Study. *The Career Development Quarterly*, 62(1), 44-55. doi: 10.1002/j.2161-0045.2014.00069.x
27. Whiston, S.C., Quinby, R.F. (2009). Review of school counselling outcome research. *Psychology in the Schools*. 46(3), 267-272. Retrieved from <https://onlinelibrary.wiley.com/doi/pdf/10.1002/pits.20372>
28. Wilkerson, K., Perusse, R., & Hughes, A. (2013). Comprehensive School Counseling Programs and Student Achievement Outcomes: A Comparative Analysis of RAMP versus Non-RAMP Schools. *Professional School Counseling*, 16(3), 172-184. doi: 10.1177/2156759X1701600302

Primary Paper Section: A

Secondary Paper Section: AM, AN

LEGAL AND INDIVIDUAL REGULATION OF SURROGACY: INTERDISCIPLINARY COMPARATIVE RESEARCH OF THE PHENOMENON

^aMARINA RYAZANOVA, ^bSERGEY BARYSHEV,
^cGUZEL TUKTAROVA, ^dOLGA AKSYONOVA,
^eGULNARA AKHMETZHYANOVA, ^fALSU KARIMULLINA,
^gELENA KOVALKOVA, ^hDIANA ZDUNOVA

^{a,b,d,e,f,g,h}Kazan branch of the Russian State University of Justice,
 7a 2-ya Azinskaya St., Kazan, 420088, Russia

^cKazan National Research Technical University named after
 A.N. Tupolev – KAI, 10 Karl Marx St., Kazan, 420111, Russia

email: ^agrimdim@mail.ru, ^bbarsh1976@yandex.ru,
^cgmtuktarova@kai.ru, ^daksjus@mail.ru,
^eaxmetzanova_gula@mail.ru, ^faekarimullina@mail.ru,
^gekovalkova@yandex.ru, ^hArtemey78@yandex.ru

Abstract: The paper reveals regulatory boundaries of surrogacy relations. The object of the research deals with the analysis of Russian and overseas legislation ruling issues of contractual and consequential aspects. Current Russian legislation is of some gaps in establishing terms of surrogacy agreements. This results in parties' ambiguous assessment of the terms of obligations. In the Russian Federation legislation some definite issues concerning the procedure for surrogacy have remained unresolved. Foreign experience in legislation to surrogacy is particularly valuable in dealing with the issues within judicial and contractual practice. The authors compared several legal systems to justify some definitive findings of the research.

Keywords: surrogacy, assisted reproductive technologies, family law, parental rights, contract, individual regulation.

1 Introduction

For a long time, Russian legislation did not contain any legal provisions on surrogacy, except for the possibility of using an assisted reproductive technology. The issue of the grounds for surrogacy relationship, including rights of parties to make their own claims remained unresolved. In fact, the parties to the surrogacy contract themselves determined all specifics of fulfilling their obligations. However, even the use of contractual structures did not have an unambiguous legal basis, since the legal acts which were in force in the Russian Federation before 2011 did not oblige prospective parents to enter into any agreement. Often one had to use oral forms and rely on the good will of all parties involved.

Therefore, this state of affairs arising out of surrogacy led to legal issues needed to be fixed. The only source of regulation was the court, which, against the background of a vast gap in legislation, could not settle cases in favour of all the parties concerned. Contract was therefore of fundamental importance in regulating these obligations. The parties to the contract stipulated the terms of payment, the surrogacy programme, the obligations to inform each other mutually, as well as the woman's observance of medical recommendations and ensuring her life support until the birth of the child.

The Federal Law of 2011 "On the fundamentals of healthcare in the Russian Federation" introduced the definition of surrogacy¹ for the first time. Its central feature is the contract whereby a surrogate mother conceives and gives birth to a child. Although Article 55 of the Act does not set out the basic substantive requirements for a surrogacy contract, it outlined certain legal restrictions.

For example, this Federal Law only allows such a contract to be concluded with potential parents who are not able to bear and give birth to a child for medical reasons (Article 55, Paragraph 9). A surrogate mother is to meet a much wider range of requirements: from the age to the state of health. Specifically, in the Russian Federation a woman may conclude the surrogate contract as a surrogate mother if she is from 20 to 35 years old.

At the same time, the woman should have at least one child of her own. Moreover, the legislation emphasizes that her child should be healthy. A potential surrogate mother also has to meet certain health characteristics. Therefore, she has to get a special medical certificate. The Act specifies the conditions for a married woman to participate in surrogacy.

Within linguistics aspects the term *surrogacy* is classified as being a non-equivalent lexical unit, it was borrowed directly, not forming a calque for it is a loan-word and a culture-specific element. The lexical item "surrogacy" is not included in general defining dictionaries (by S.I. Ozhegov, V.I. Dal, A.P. Evgenyeva) in its meaning as "surrogate motherhood", but presented in thesaurus dictionaries of legal terms². In legal texts in the Russian language the term is used as *surrogatnoje materinstvo* (surrogate motherhood). Borrowing is a natural process of language development. A lexical borrowing enriches language and as a rule does not harm its identity, this preserves basic vocabulary and grammatical structure of language remains unchanged. For example, Czech word *robot* have become literally international, it can be found in English, Russian, Spanish, Swedish, Norwegian, Estonian, it also transformed into German *Roboter*, Finnish *robotti* enriching vocabularies of these languages. A separate word *surrogacy* is also not a problem for identity of the Russian vocabulary. The reason for borrowing this word is its being a new term and having no Russian equivalent. The latter is for its belonging to foreign linguistic reality. As the phenomena of surrogacy is not of the Russian origin, the loan-word *surrogacy* is used and not a new one has been invented. The legal term *surrogacy* is termed in Russian as *surrogatnoje materinstvo* where the first term element is a loan-word formed according to rules of derivation but with borrowed word root – *surrogat-* (with stem ending –*t* from Latin) + *-n* Russian verbal adjective suffix of result of some action that is named by the source word + *-oje* neuter ending in the Russian nominative case. Thus, the derivational analysis has revealed that in the Russian language the term is formed as hybrids: it is formed by joining to the foreign root the Russian suffix and the ending form.

2 Methods

The main methods developed within legal science were used to carry out the research. The authors analysed laws and implementing regulations using a systemic-functional approach. It resulted in specifying the limits of legal regulation of surrogacy. The hermeneutic method was applied in defining the terms used in the regulation of relations of parties. This method allowed to define the meaning of legal norms aimed at establishing features of individual regulation of surrogacy. Both historical method and the method of comparative law were applied to trace the development trends of the Russian and foreign surrogacy concepts. Using the formal-legal method the authors compared the current legislation with judicial practice and revealed the general approach towards assessing the legal relations under study. The method of complex analysis was also applied in order to summarise theoretical conclusions and formulate the authors' proposals for solving legal problems. Linguistic comparative analysis was also used to reveal the peculiarity of the term formation based on a lexical borrowing.

3 Results and discussion

In contrast to Russian legislation, a number of other states have different approaches to the surrogacy concept. Even among European countries there is no unambiguous position on this issue.

¹ Federal law dated 21.11.2011 N323-FZ (changes 13.01.2020) "On fundamental healthcare principles in the Russian Federation". Legislation Bulletin of the Russian Federation, 2011. N48, article 6724; 2020. N3, article 275.

² Ardasheva N.A. Dictionary of terms and notions on medical law. SPb., 2007. Pp. 474-475.

The foregoing can be proved with the exercise of complete ban on the use of surrogacy as assisted reproductive technology contained in the legislation of Germany, France, Norway, Austria, and Sweden. A similar model of legal regulation has been established in some North American states (Michigan, Arizona).

Non-commercial nature of surrogacy relationships is highlighted in current legislation of the United Kingdom. The prohibition of any remunerated use of this method is contained in the legislation of such states as Israel, Canada, and Australia. No legal provisions on surrogacy are in legislations of Finland, Belgium, Greece and Spain. In these countries, this method of childbirth is actually practised, but without state intervention in the regulation aspects of surrogacy relations. Nevertheless, these relations are based on a certain contractual framework within which the parties determine how to fulfil their obligations³.

Thus, the Russian Federation is one of the countries where any type of surrogacy (commercial and non-commercial) is allowed. A similar mechanism of legal regulation has developed in most states of the United States of America as well as in the post-Soviet countries (Kazakhstan, Belarus, Ukraine, etc.).

In contrast to Belarusian law, the Russian surrogacy institution implies a wider freedom of contract. The parties are only obliged to adhere to certain requirements specified in the Federal Law of 2011. In addition to terms that must be met by the parties on this obligation, legal restriction is the inadmissibility of the coincidence of the surrogate mother and the donor of oocyte (Article 55, Paragraph 10). Thereby the principle basis for this assisted reproductive technology is provided: the child born by a surrogate mother is genetically the child of the potential parents who have made the relevant contract with the woman (surrogate mother)⁴.

United Kingdom legislation requires the potential parents to adopt the child born by a surrogate mother. In Belarus, the approach is different: not a surrogate mother but genetic mother of such a child is recognized to be his or her mother. Therefore, the fact of birth is considered as a legal fact of establishing maternity and paternity with respect to such children. At the same time, the Belarusian legislation requires that the contractual consent must be given by the maximum number of persons having a legal interest in surrogacy: potential parents-customers, a surrogate mother and her spouse. The same rule is a subject to terms of the Russian legislation, provided that the woman is married.

Researchers have ambiguously defined the limits of legal and individual regulation of surrogacy relationships. Thus, some scientists note that the parties are free to choose the conditions aimed at the maximum regulation of fundamental issues affecting the procedure of pregnancy carrying, birth and transfer of the child to the potential parents⁵. Other authors believe that loopholes in the law become a factor of abuse of the rights by the parties to a surrogacy contract⁶.

Thus, two key positions have emerged in the legal doctrine:

- 1) the need for legal regulation of relations arising from surrogacy;
- 2) the preservation of individual freedoms in establishing the conditions of surrogacy through individual regulation (by means of a contract or verbal agreements).

A moderate combination of legal and individual contractual regulation is noted by some researchers on surrogacy issues

based on a generalization of judicial practice⁷. In the Russian Federation, judicial practice has become determinative when disputes arise over the performance of a surrogacy contract.

In particular, the most common cases are disputes over assignment of a child born by a surrogate mother to parents-customers. Since the Family Code of the Russian Federation⁸ stipulates that the persons on the same side in the contract as spouses may be recorded as the parents of the child born only with the consent of the surrogate mother, it is she who has the right to decide on the main contractual obligation.

In 2017 the Supreme Court of the Russian Federation determined for such cases the fundamental significance of terms of a contract concluded by the parties on surrogacy⁹. However, only those contractual provisions that regulate consequences of a surrogate mother's refusal to resign a child to parents-customers are taken into account. Since these issues have not been resolved by law in Russia, it is up to the parties to the contract to initially establish the procedure for both the terminating their obligations and the consequences of such a decision.

Simultaneously with the above mentioned principles, the fact of genetic kinship between parents-customers and a child born by a surrogate mother becomes important. The Supreme Court of the Russian Federation is of a just opinion that the refusal of a woman who has given birth to a child conceived by means of assisted reproductive technology using the germ cells of other persons may be challenged by potential parents in court. In this regard, the Constitutional Court of the Russian Federation ruled that a surrogate mother's groundless use of the right to refuse to register such persons as parents of the child can be regarded as an abuse of right¹⁰.

A dispute over a child born by a surrogate mother is to be resolved based on a combination of circumstances. In addition to those mentioned above, official judicial practice emphasises the need to consider interests of a child in the universally recognised perception of Article 3 of the Convention on the Rights of the Child. The Russian Federation is a party to this international instrument, so its highest courts adhere to the position of compliance with international norms.

Still the above mentioned issue does not clear up the question of who has to prove that the surrogate mother's refusal to consent to the registration of the child's parents is groundless. Furthermore, it is questionable whether the woman can justifiably refuse to hand over the child to the parents-customers. Current case law on this issue has not developed criteria that are admissible in such situations. Therefore, this gap can only be filled by individual-contractual regulation i.e. by the parties themselves in the surrogacy relationship. If the relevant contract specifies the grounds for refusing a surrogate mother's consent to register the parents-customers as the parents of the child born by her, the will of the parties to such a relationship will be subordinated to the contract conditions.

4 Summary

The lack of sufficient legal regulation of surrogacy in the Russian Federation opens up a wide margin of appreciation for

³ Igareda González N. Regulating surrogacy in Europe: Common problems, diverse national laws. *European Journal of Women's Studies*, 2019. V. 26. №. 4. Pp. 435-446; Walker R., van Zyl L. *Three Models of Surrogacy. Towards a Professional Model of Surrogate Motherhood*. Palgrave Macmillan, London, 2017. Pp. 1-27.

⁴ Family code of the Russian Federation dated 29.12.1995 N223-FZ (edition of 06.02.2020). *Legislation Bulletin of the Russian Federation*, 1996. N1, article 16; 2020. N6, article 589.

⁵ Resolution of Plenum of the Supreme Court of the Russian Federation dated 16.05.2017 N16 "On application by courts legislative execution during hearing on the merits of parentage of children", paragraph 31. *Supreme Court of the Russian Federation Bulletin*, 2017. N7.

⁶ Constitutional Court of the Russian Federation ruling under 27.09.2018 N2318-O "On dismissal of a request for a hearing the complaint of citizens S. D. and S. T. on violation of their constitutional rights by sub-section 4 of article 51, sub-section 3 of article 52 of the Family code of the Russian Federation, sub-section 5 of article 16 of the Federal law "On vital records", part 9 of article 55 of the Federal law "On fundamental healthcare principles in the Russian Federation".

³ Picchi M. *Surrogate Motherhood: Protecting the Best Interests of the Child in Light of Recent Case Law*. *Peace Human Rights Governance*, 2019. V. 3. N3. Pp. 307-331.

⁴ Shigonina K.A., Kovalenko K.I. Aspects of legal regulation of surrogacy within the current Russian legislation. *Sinerhiya nauk*, 2019. N31. Pp. 1320-1332.

⁵ Ragoné H. *Surrogate motherhood: Conception in the heart*. Routledge, 2019. 215 p.

⁶ Van den Akker O. B. A. *Ethical, Moral and Human Rights Considerations in Surrogate Motherhood*. *Surrogate Motherhood Families*. Palgrave Macmillan, Cham, 2017. Pp. 231-267.

parties in such relationships. The agreement between the parties is intended to define the scope of this discretion and prevent possible abuse for all concerned parties. Current Russian legislation should contain more detailed provisions obliging the potential parents and the surrogate mother to include in the agreement the detailed conditions of fulfilment of mutual obligations. In addition to the need to enter into a surrogacy agreement, the parties should be required to provide for grounds for involuntary termination of their relationship as well as to prevent negative consequences associated with each party's withdrawal from obligations.

If the surrogacy contract contains the most specific terms for the construction of relationship between a woman carrying a child and potential parents, the Russian courts will be obliged to take into account the specifics of individual regulation of the case. We believe that generalizing surrogacy practice and elevating it into legal norms cannot serve as an effective tool for problems to be solved. This is primarily due to various socio-economic and personal characteristics as well as the ethics of surrogacy.

Due to the above mentioned circumstances, the legal regulation of surrogacy relationships should determine the essential terms of the contract, which the parties are obliged to provide for when concluding the deal. However, the law cannot interfere in the personal sphere of people's lives, leaving them free to detail the content of their own surrogacy contractual obligations.

5 Conclusions

The results of this report show that the approaches to legal regulation of surrogacy have evolved in legal doctrine along with the increased contractual practice. State interference in surrogacy relationships infringes on individual freedoms. The moderate proportion of public law and individual contractual regulation can be traced back to the generalisation of judicial practice, which becomes under the necessity to fill many of the gaps in legislation upon surrogacy. Thus, the obligation for parties in these legal relationships to enter into a surrogacy contract entails a certain contractual freedom to be followed. If a surrogate mother refuses to comply with the terms of the agreement, including those regarding the transfer of a child to genetic parents, her decision is a case of wrongdoing but cannot be declared illegal. The central conclusion of the research stands for the next: since a number of related issues are not regulated by law (paternity of a child not handed over to his or her genetic parents; fate of a child when surrogate mother dies after having left the child to herself; sanctions for parties, etc.), parties of surrogacy relationship are to determine relevant terms in a special contract.

Literature:

1. Ardasheva N.A. *Dictionary of terms and notions on medical law*. SPb., 2007. Pp. 474-475.
2. *Constitutional Court of the Russian Federation ruling under 27.09.2018 N2318-O* "On dismissal of a request for a hearing the complaint of citizens S. D. and S. T. on violation of their constitutional rights by sub-section 4 of article 51, sub-section 3 of article 52 of the Family code of the Russian Federation, sub-section 5 of article 16 of the Federal law "On vital records", part 9 of article 55 of the Federal law "On fundamental healthcare principles in the Russian Federation". [URL]: <https://legalacts.ru/sud/opredelenie-konstitutsionnogo-suda-rf-ot-27092018-n-2318-o/> (access date - 02.02.2021).
3. *Family code of the Russian Federation* dated 29.12.1995 N223-FZ (edition of 06.02.2020). Legislation Bulletin of the Russian Federation, 1996. N1, article 16; 2020. N6, article 589.
4. *Federal law* dated 21.11.2011 N323-FZ (changes 13.01.2020) "On the fundamentals of healthcare in the Russian Federation". Legislation Bulletin of the Russian Federation, 2011. N48, article 6724; 2020. N3, article 275.
5. Igareda González N. *Regulating surrogacy in Europe: Common problems, diverse national laws*. European Journal of Women's Studies, 2019. V. 26. №. 4. Pp. 435-446.

6. Garzone G. E. *New biomedical practices and discourses: Focus on surrogacy*. Text & Talk, 2019. V. 39. N3. Pp. 363-387.
7. Picchi M. *Surrogate Motherhood: Protecting the Best Interests of the Child in Light of Recent Case Law*. Peace Human Rights Governance, 2019. V. 3. N3. Pp. 307-331.
8. Ragoné H. *Surrogate motherhood: Conception in the heart*. Routledge, 2019. 215 p.
9. Shigonina K.A., Kovalenko K.I. *Aspects of legal regulation of surrogacy within the current Russian legislation*. Sinergiya nauk, 2019. N31. Pp. 1320-1332.
10. Stolyarova E.G. *Surrogacy as bioethical problem and its legal regulation*. Novy yuridichesky vestnik, 2019. N1 (8). Pp. 24-29.
11. *Resolution of Plenum of the Supreme Court of the Russian Federation* dated 16.05.2017 N16 "On application by courts legislative execution during hearing on the merits of parentage of children". Supreme Court of the Russian Federation Bulletin, 2017. N7. [URL]: <http://base.garant.ru/71676064/> (access date - 02.02.2021).
12. Van den Akker O. *Ethical, Moral and Human Rights Considerations in Surrogate Motherhood*. Surrogate Motherhood Families. Palgrave Macmillan, Cham, 2017. Pp. 231-267.
13. Walker R., van Zyl L. *Three Models of Surrogacy*. Towards a Professional Model of Surrogate Motherhood. Palgrave Macmillan, London, 2017. Pp. 1-27.
14. Walker R., Van Zyl L. *Towards a Professional Model of Surrogate Motherhood*. Springer, 2017. 220 p.
15. Yadav R., Anand S. *Commercial surrogacy: legal, social, ethical issues*. Journal of legal studies and research. V. 4. Issue 5, 2018. Pp. 290-300.

Primary Paper Section: A

Secondary Paper Section: AG, AI

PECULARITIES OF FINANCIAL REGULATION: IDENTIFICATION AND SEIZURE OF CRIMINAL PROPERTY

^aJANA ŠIMONOVÁ, ^bJOZEF ČENTĚŠ, ^cANDREJ BELEŠ

^aAcademy of Police forces, Sklabinská 1, Bratislava, Slovakia, jana.simonova@minv.sk, ^{b,c}Comenius University in Bratislava, Šafárikovo nám. 6, Bratislava, Slovakia, ^bjozef.centess@flaw.uniba.sk, ^candrej.beles@flaw.uniba.sk

The present research was supported by the Slovak Research and Development Agency under contract no. APVV-15-0740 Guidelines and tools for effective elimination of unlawful acts in relation with potential insolvency.

Abstract: In the present paper, the authors consider the fundamental issues affecting the identification and seizure of criminal property in the context of financial forensics and investigation in practice. One of the considered issues is the identification and seizure of financial assets and their proceeds which are infiltrated into the financial sector by means including the use of financial intermediaries and advisors. The authors identify areas, where it is important that legislation continues to evolve to allow adequate measures to be taken for combating organised crime. There needs to be established a specialised unit for the identification and seizure of property, financial investigations and comprehensive property profiling. A solution for a fast implementation of seizure is the creation of a central register of accounts providing information not only on the current status of accounts but also on their transaction histories.

Keywords: financial analysis, property, seizure, confiscation, freezing, financial market, money.

1 Introduction

The identification and seizure of offenders' property is not just an issue in economic and property crime but also a wider variety of crimes including the trafficking of drugs, people, weapons, waste and the like, which are important sources of income for organised crime. Organized crime as phenomenon affects significantly security of society and is among threats to sustainable development processes (e.g. Čentěš, J. et al. 2018).

Criminal groups seek above all things to make a profit and structure their criminal enterprises accordingly. In 2011 Europol reported (<https://www.europol.europa.eu/publications-document-s?page=1&t=money%20laundering>) that 70% of all types of crime are driven by an insatiable demand to acquire assets (illicit income). The most effective measure against organised crime is the prompt identification, seizure and subsequent confiscation of criminal assets.

Organised crime habitually crosses international borders. To combat it, the competent law enforcement authorities need high quality, effective cooperation and coordination in the identification and seizure of assets. A comprehensive global system for the identification and seizure of proceeds of crime is also a vital part of protecting the financial sector. The identification of illegally acquired property can also help to unmask links between offenders and other participants in organised crime and can lead to positive fiscal and economic impacts when criminal property is confiscated (Dvořák, 2006, p. 28). The freezing and confiscation of the instrumentalities and proceeds of crime remove the financial incentives for crime (point 16 of Directive (EU) 2018/1673 of the European Parliament and of the Council of 23 October 2018 on combating money laundering by criminal law).

The lawfulness of activities, transactions and proceeds is determined by rules and acts of law. The state's enforcement of the laws can influence, regulate and control the occurrence of some undesirable economic phenomena, increase the cost of crime to the point where it become unprofitable and thus eliminate opportunities for organised crime and terrorism to take root in its territory. Unlawful activities, transactions and proceeds undermine the financial sector's integrity, stability and reputation and go hand in hand with dishonest practices that generate dirty profits.

2 The basic legal framework for the identification and seizure of property in international documents

To function well, the financial sector requires a legal framework that defines effective penalties and individual liability for participation in money laundering and transactions with criminal assets. Relevant supranational legislation can be an effective means of protection against money laundering, an activity that undermines the economic stability of the state and destabilises the financial sector (Nováčková, D. 2001). Procedures for identifying and securing criminal assets make up a broad field and the recommendations and legislation discussed below should be considered as examples illustrating the theme of the present paper.

Important recommendations are included in the forty recommendations adopted by the Financial Action Task Force (FATF) and their four revisions (Vondráčková, 2016, p. 29 et seq.). The most important recommendations in the scope of this paper are those defining a financial investigation as an enquiry into the financial affairs related to a criminal activity, with a view to:

- identifying the extent of criminal networks and/or the scale of criminality;
- identifying and tracing the proceeds of crime, terrorist funds or similar assets;
- identifying assets that are, or may become, subject to confiscation; and
- developing evidence which can be used in criminal proceedings.

The basic legal framework for the identification and seizure of assets is set out in legislation on the fight against organised crime, financial forensics and financial investigation. International documents are especially relevant when the seizure of property depends on judicial cooperation in criminal cases based on a request for legal assistance (letters rogatory).

The United Nations Convention against Transnational Organized Crime (Palermo Convention of 15 November 2000) sets a clear line between the "seizing" or "freezing" of assets on the one hand, and their confiscation on the other. "Seizing" or "freezing" property means temporarily prohibiting the transfer, conversion, disposition or movement of the property or temporarily assuming custody or control of the property on the basis of an order issued by a court or other competent authority. "Confiscation" includes forfeiture and means the permanent deprivation of property. Under Article 12 of the Palermo Convention, states must adopt within their domestic legal systems measures to enable the identification, freezing or seizure of property used in or destined for use in offences covered by the Convention and also proceeds of crime. Property means assets of every kind, whether corporeal or incorporeal, movable or immovable, tangible or intangible, and legal documents or instruments evidencing title to, or interest in, such assets and the term proceeds of crime means any property derived from or obtained, directly or indirectly, through the commission of an offence. Article 13 establishes rules for international cooperation for the purposes of confiscation of such property (see more Púry, F., 2004, p. 80).

In the real world, proceeds of crime are often intermingled with legally acquired property. Such intermingled property is liable to confiscation up to the assessed value of the intermingled proceeds of crime (Art. 12(4) of the Palermo Convention). The procedure for the preliminary identification of criminal assets and their subsequent seizure and confiscation must be complemented by rules for disposal of such assets by the state that carried out their confiscation. From a critical perspective, it should be noted that Slovakia does not have a comprehensive

legislative framework to regulate the administration and disposal of such assets.

The most detailed international anti-money laundering document is the Council of Europe Convention on Laundering, Search, Seizure and Confiscation of the Proceeds from Crime (the Strasbourg Convention of 8 November 1991), which lays down definitions of basic terms such as proceeds, property, instrumentalities, and confiscation. The Strasbourg Convention has two fundamental objectives: to oblige states to adopt effective domestic measures to penalise money laundering, including its criminalisation, and to facilitate the broadest possible cooperation between states in investigating crimes and confiscating the proceeds of crime (Púry, F., 2004, p. 80).

Article 11 of the Strasbourg Convention obliges parties to take provisional measures at the request of another party that has instituted criminal proceedings or proceedings for the purpose of confiscation. In such a case, the requested party must take specific provisional measures such as the freezing or seizure of property to prevent any dealing in, transfer or disposal of property which, at a later stage, may be the subject of a request for confiscation or which might be such as to satisfy the request. Measures may apply to any property. The provisions highlight the importance of taking provisional measures in good time to freeze property before it can be transferred to new owners. The main purpose of seizing or freezing property in the requested state is its subsequent confiscation in criminal proceedings. For the application of Article 11 and related provisions of the Strasbourg Convention, it is vital to satisfy not just the basic requirements such as contractual reciprocity, double criminality, but also to present evidence that the property is in the territory of the requested state and is causally linked to crime (it is proceeds of crime).

The Council of Europe Convention on Laundering, Search, Seizure and Confiscation of the Proceeds from Crime and on the Financing of Terrorism (Warsaw Convention of 16 May 2005) is another of the international treaties that clarify and enlarge upon the basic concepts in this area. For example, freezing or seizure is defined as temporarily prohibiting the transfer, destruction, conversion, disposition or movement of property or temporarily assuming custody or control of property on the basis of an order issued by a court or other competent authority (Article 1(g) of the Warsaw Convention). International cooperation in seizing property in another state is very important so that all parties can respond appropriately to requests to confiscate a part of some property (proceeds), to assist in an investigation, or to take provisional measures. The basis for transnational assistance in identifying money market property, primarily in banks, is outlined in Articles 18 (Requests for information on banking transactions) and 19 (Requests for the monitoring of banking transactions) and also in the provisions on the disclosure of so-called spontaneous information.

Clear justification for the seizure or freezing of property by means of a provisional measure is established by the need to prevent the transfer, conversion or disposition of property whose confiscation may be required. Measures adopted by Parties under Article 5 of the Warsaw Convention for the identification, tracing, freezing or seizure of property should also encompass property into which criminal proceeds have been transformed or converted, property acquired from legitimate sources, if proceeds have been intermingled, in whole or in part, with such property, up to the assessed value of the intermingled proceeds, and income or other benefits derived from proceeds, from property into which proceeds of crime have been transformed or converted or from property with which proceeds of crime have been intermingled, up to the assessed value of the intermingled proceeds, in the same manner and to the same extent as proceeds.

Provisions on the identification and seizure of property are included in several legislative documents of the European Union (for a history of EU anti-money-laundering legislation, see Klimek, 2011, p. 92 et seq).

One of the most important documents on the identification and seizure of property is Council Decision 2007/845/JHA concerning cooperation between Asset Recovery Offices of the Member States in the field of tracing and identification of proceeds from, or other property related to, crime ("Commission Decision 2007/845/JHA"), which established Asset Recovery Offices on the national level. It requires every Member State to set up or designate a national entity to act as an Asset Recovery Office ("ARO") to facilitate the tracing and identification of proceeds of crime and other crime related property which may become the object of a freezing, seizure or confiscation order made by a competent judicial authority in the course of criminal proceedings. Information exchange should take place not only on request but also spontaneously.

Alongside this basic purpose, the AROs serve a secondary purpose of exchanging best practices in improving the effectiveness of Member States' efforts to trace and identify criminal proceeds and assets. Domestic legislation must not prevent asset recovery cooperation with the authorities of other EU Member States. The ARO is the executive operational unit for functions resulting from Council Decision 2007/845/JHA in accordance with the procedures and time limits provided for in Council Framework Decision 2006/960/JHA, which lays down rules for the execution and provision of documentation and information for the needs of the members of the international network of agencies concerned with the cross-border identification, freezing, seizure and confiscation of the proceeds of crime and other crime related property (Šimonová, J, Čentěš, J., Beleš, A., 2019).

The decision also provides a legal basis for the exchange of knowledge between experts from several countries in methods and techniques for identification, freezing, seizure and confiscation of property through the Camden Assets Recovery Inter-Agency Network. Amongst other benefits, the countries can use this network to share best practice based on actual cases. The range of criminal offences benefitting from measures for identification, freezing and confiscation of property is broadened by Directive 2014/42/EU of the European Parliament and of the Council of 3 April 2014 on the freezing and confiscation of instrumentalities and proceeds of crime in the European Union ("Directive 2014/42/EU"). Directive 2014/42/EU lays down minimum rules for freezing and confiscation of the instrumentalities and proceeds of crime in criminal cases and requires Member States to take the necessary measures to enable the freezing of property with a view to possible subsequent confiscation. The legal basis of the Directive 2014/42/EU is Art. 82 TFEU, which allows the adoption of procedural tools, as well as Art. 83 TFEU, which provides for the competence to determine the criminality of certain acts and to provide for sanctions; the instruments of confiscation under the Directive 2014/42/EU are therefore limited to the areas of criminal offenses set out in Article 83 TFEU (see Mitsilegas, V. 2018, p. 59 and Streinz, R. et al., 2018, p. 957).

Freezing encompasses restrictive measures preventing the disposal of property, including its transfer, destruction or conversion, preventing movement of property or temporarily assuming custody or control of property, the purpose of which is to preserve property de facto without change. Under Article 4 of Directive 2014/42/EU, confiscation of property that is proceeds or instrumentalities of crime shall take place after final conviction for a criminal offence, and is also permitted in cases such as illness or absconding where the suspected or accused person does not attend proceedings for a longer period and thus proceedings cannot continue under regular conditions and a final conviction is impossible.

Directive 2014/42/EU also permits the freezing of a third party's property if the property was transferred to them directly or indirectly by a suspected or accused person free of charge or in exchange for an amount significantly lower than the market value and the third party knew or ought to have known, in the light of all the circumstances, that the purpose of the transfer or acquisition was to avoid confiscation. If frozen property is not

subsequently confiscated, it must be returned to the owner. The effective freezing of property eliminates the financial incentives that interest organised crime. It is now recommended (Directive (EU) 2018/1673 of the European Parliament and of the Council of 23 October 2018 on combating money laundering by criminal law) that the freezing of property should be extended to cases where it is not possible to initiate or conclude criminal proceedings (which is already feasible in part). Besides freezing, it is necessary to have an accurate and timely process for identifying property and the competent authorities must have effective financial analysis tools.

Another important document in this area is Directive (EU) 2015/849 of the European Parliament and of the Council on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing ("Directive 2015/849"). The purpose of Directive 2015/849 is to implement measures on the EU level to prevent the financial system being used (misused) for money laundering and terrorist financing. Directive 2015/849 defines the offences that are to be treated as money laundering and terrorist financing and stipulates that they must be prosecuted as such even when the criminal activity that generated the assets for laundering was committed in another Member State or in a third country.

Further steps to use the criminal law to combat money laundering and enable faster and more effective cross-border cooperation in the EU were taken in Directive (EU) 2018/1673 of the European Parliament and of the Council of 23 October 2018 on combating money laundering by criminal law ("Directive 2018/1673"). Directive 2018/1673 lays down minimum rules for money laundering offences and penalties. This directive is part of the legislation of the so-called European criminal offenses (Klimek, 2017a, p. 67), as well as the so-called 32 categories of mutual recognition offenses (Klimek, 2017b, p. 502).

A further purpose of Directive 2018/1673 is to criminalise money laundering that is committed intentionally and with the knowledge that the property was derived from criminal activity. This means that there should be no distinction between situations where property has been derived directly from criminal activity and situations where it has been derived indirectly from criminal activity, applying the broad definition of "proceeds" laid down in Directive 2014/42/EU.

When considering whether the property is derived from criminal activity and whether the accused person knew it, the specific circumstances of the case should be taken into account, such as the fact that the value of the property is disproportionate to the lawful income of the accused person and that the criminal activity and acquisition of property occurred within the same time frame.

Member States should, as a minimum, ensure the freezing and confiscation of the instrumentalities and proceeds of crime in all cases stipulated in Directive 2014/42/EU. Member States should also strongly consider enabling confiscation in all cases where it is not possible to initiate or conclude criminal proceedings, including in cases where the offender has died.

Another important document for confiscations in the EU is Regulation (EU) 2018/1805 of the European Parliament and of the Council of 14 November 2018 on the mutual recognition of freezing orders and confiscation orders ("Regulation 2018/1805"), which becomes directly applicable from 19 December 2020. It will replace the Council Decisions 2003/5777/JHA and 2006/783/JHA.

The aim of Regulation 2018/1805 is to achieve a situation in which it is impossible to profit from criminal activities in the EU. Possible orders include not just confiscation based on a criminal conviction but also extended confiscation and confiscation without prior conviction.

3 The basic legal framework for the identification and seizure of property in the Slovak Republic

The legislation laying down the basic legal framework for the identification and seizure of property in the Slovak Republic is described below.

Act No 297/2008 on prevention of the legalisation of proceeds of crime and protection against terrorist financing, and amending certain acts, as amended covers these issues in Section 4 unusual trading operations, Section 5 obliged persons and, for the seizure of property, also the provisions of Section 16 on the freezing of unusual trading operations by an obliged person to prevent the frustration of seizure of the proceeds of crime and Section 26 on the Financial Intelligence Unit which performs tasks necessary for the identification of property where money laundering is suspected (Čentěš, J., Tuchscher, M., 2009a; Čentěš, Tuchscher, 2009b; Stieranka, J., Marko, M., Backa, S., 2018; Klátik, J., 2011).

Act No 171/1993 on the Police Force, as amended regulates the general and special powers of members of the Police Force, including powers under Section 29a by which an officer in the financial police or criminal police is entitled to request, in writing, that a bank or branch of a foreign bank provide information on one of their clients that is protected by bank secrecy (Section 91(4)(g) of Act No 483/2001 on banks and amending certain acts, as amended) if such information is needed for the investigation of tax evasion, illegal financial transactions, money laundering or related offences, or for the identification of the perpetrators of such offences.

Act No 300/2005 the Criminal Code, as amended, regulates the criminal law aspect of the identification and seizure of property in terms of both material and procedural law. The relevant sections of the Criminal Code are Section 60 - Punishment by forfeiture of goods, Section 58 - punishment by forfeiture of property, Section 83 - confiscation of a thing and Sections 233 and 234 regarding the criminal offence of money laundering (Machová, 2017, p. 175 et seq.).

Act No 301/2005 the Code of Criminal Procedure, as amended, defines a range of procedures to regulate the identification and seizure of property. First and foremost of these is the preparation of a property profile for the law enforcement authorities, which is used to ensure the consistent application of Section 119(1)(f) of the Code of Criminal Procedure and other purposes laid down by law such as securing an injured party's claim to compensation for criminal damages. Other relevant provisions include those on the seizure of cash (Section 95) and book-entry securities (Section 96), the seizure of injured party's claims (Section 50) and seizure implementing a sentence of forfeiture of property (Section 425). Operational activities and financial forensics are regulated mainly by the fifth title of the Code of Criminal Procedure, Information Gathering. Identification is impossible without the cooperation of state authorities and legal and natural persons, which is regulated by Section 3 of the Code of Criminal Procedure.

Act No 101/2010 on proof of the origin of property, as amended, lays down conditions and defines the procedure of public authorities for the confiscation of the property of legal and natural persons that a court has judged to have been acquired from an unlawful source and in cases where a sentence of forfeiture of a thing is imposed. If there are grounds to believe that property was acquired from illegal activities, an obliged person must provide such information to the financial police service of the Police Force. The financial police service may also investigate income, the value of property and the method of its acquisition at their own initiative. In addition to the above, it provides all relevant documents that could serve as evidence.

Act No 316/2016 on recognition and enforcement of property decisions in criminal proceedings in the European Union and amending certain acts, as amended, transposes into Slovak law

Council Framework Decision 2006/783/JHA on the application of the principle of mutual recognition to confiscation orders.

Based on the Vienna Convention, the Palermo Convention and the Strasbourg Convention, and having regard for European law, it would be more than desirable to be able to seize property without final conviction for a criminal offence, and to require offenders to prove the lawful origin of their property (law on proof of the origin of property) For most part, however, Slovak law on the identification and seizure of property is in accordance with the applicable conventions.

4 Procedures for the identification and seizure of property

The reliable detection and investigation of persons accused of predicate offences or money laundering is a condition for prosecuting the perpetrators and other persons involved in the placement, layering and integration of "dirty money" and naturally also for the seizure and confiscation of such proceeds. The final report of the National Assessment of the Risk of Money Laundering and Terrorist Financing in the Conditions of the Slovak Republic indicated that the competent authorities had, in the period under review, seized approximately 12.24% of identified laundered criminal property. Information from law enforcement authorities showed that minimal use was made of direct instruments for confiscation of the proceeds of crime under Section 233 of the Criminal Code (https://www.min.v.sk/swift_data/source/policia/fsj).

In the identification and seizure of assets, special attention must be given to financial regulation, which is a very sensitive issue for every business (Chinchalad, N., 2020). It is therefore essential that financial sector entities consistently fulfil their identification-related obligations under Act No 297/2008 to report unusual trading operations to the Financial Intelligence Unit (FIU). The FIU can freeze unusual trading operations and, in cooperation with law enforcement authorities, seize property such as cash, which may be subject to confiscation in subsequent criminal proceedings.

Financial sector entities are constantly making innovations in both regulated and non-regulated forms of financial market investments that can be misused to conceal illegally obtained property. An example is virtual assets, which are a de facto form of property. Innovative financial instruments require regulation, i.e. the service providers should be licensed and registered (Slezáková, A., Šimonová, J., Jedinák, P. et al., 2020). As soon as a financial service provider achieves the level of sophistication to create a system for deliberately avoiding regulation and licensing, it becomes very difficult to identify the source and ownership of virtual assets. The legislation governing regulation of the financial sector and financial markets therefore needs to evolve rapidly. One of the current priorities is determining the registration and jurisdiction of the providers of services related to cryptocurrencies, investment tokens and game tokens. To ensure full identification of this type of property, it would be desirable for the regulatory body (in the case of Slovakia, Národná banka Slovenska) to have access to the relevant databases.

The identification and seizure of property can be subsumed under the concept of financial forensics, i.e. the process of finding and documenting criminal assets and the proceeds of crime. The construction of a property profile is an integral part of this process. A property profile can be prepared for a natural person or legal entity and sets out information on the tangible and intangible assets that the person owns or to which they have a relationship establishing their right to the assets' ownership or co-ownership in future. Profiling begins with a check of databases that clearly point to ownership such as the real estate cadastre, bank accounts and securities accounts but also covers cash and other assets held in other forms of ownership (see Section 130 of the Criminal Code).

4.1 Property identification

A precondition for property identification is to establish the reason for suspecting causal links between the property to be identified and a criminal offence, and between the property and a specific person. The basic resources include the Geodesy, Cartography and Cadastre Authority of Slovak Republic and the district offices (cadastral records for real estate, Sections 2, 68 and 69 of Act No 162/1995 on the real estate cadastre and on registration of ownership and other rights over real estate /the Cadastral Act/), banks with their registered office or a branch in the Slovak Republic (money market or banking instruments such as current accounts, payment cards, loans, safe deposit boxes, banking contracts etc., Sections 38a(4), 91(4)(g) and (b) of Act No 486/2001 on banks and amending certain acts, as amended, Act No 310/1992 on building savings, as amended), insurance companies, branches of foreign insurance companies, reinsurance companies and branches of foreign reinsurance companies (insurance market instruments e.g. investment life insurance, extraordinary life insurance deposits, single-payment life insurance, non-life insurance; Sections 72(3), 166 of Act No 39/2015 on insurance and amending certain acts, as amended), management companies (financial instruments in a part of the capital market, to be precise collective investment such as open, closed and special mutual funds; Section 162(3) of Act No 203/2011 on collective investment), the Central Securities Depository and dealers in securities (capital market financial instruments including shares and other securities of various kinds such as registered securities, securities payable to order, bearer securities; Sections 110(1), 134(3) of Act No 566/2001 on securities and investment services and amending certain acts, as amended, section 17(3) of Act No 429/2002 on the stock exchange, as amended), leasing companies, the companies register (ownership interests in companies and cooperatives), the register of motor vehicles, aircraft register, ships register, guns register.

Ownership is also identified in the case of items of historical, archaeological, collectible and artistic interest, precious metals, other movables, items related to intellectual property rights, receivables, cash etc.

The officer tasked with identification of property may use other criminal investigation procedures (Section 38a of Act No 171/1993 on the Police Force, as amended) for property identification as necessary to obtain the most comprehensive possible property profile. In more complex cases, it is appropriate to go beyond the range of standardised procedures for identifying property from accessible databases and to look at property transferred through an intermediary (while the person whose property is being profiled remains its beneficial owner), virtual assets, crowdfunding investment schemes and the like.

If identification of property is to be carried out abroad, it is necessary to properly define which state is to be addressed and the factors that point to the need for identification of property. In identification of property, the necessary information is obtained primarily from Police Force information systems, then from information sources in the public domain, information provided in response to written requests and criminal investigation procedures.

Identification of persons' property and income is covered by Section 3 of the Code of Criminal Procedure under which state authorities, higher territorial units, municipalities and other legal and natural persons are obliged to cooperate with the law enforcement authorities. Information that is subject to commercial, banking or tax secrecy and information on book-entry securities can be requested by a prosecutor or a police officer under authorisation from a prosecutor (Šramel, B., 2011) in proceedings before the president of a judicial senate. As has been repeatedly pointed out in the present work, property identification is based on financial forensics and most frequently draws on criminal investigation and intelligence activities.

Proper and effective procedures for property identification must take account of shared information on the methods most frequently used to launder the proceeds of crimes such as phishing, pharming, internet fraud, reverse loans, fictitious companies, gambling, “sleeper” accounts, carousel frauds, illegal trafficking (e.g. weapons) etc. Identification is a means for providing society with vital protection against the placement of illegally obtained funds in the legal system. The inadequate identification of property can logically lead to difficulties in confiscation or even the failure of the process. Property identification makes it possible to detect and then prosecute perpetrators not only of money laundering but also of other offences and to detect organised groups. Financial flows can reveal links that are not otherwise apparent. For example, in the Netherlands, property identification exposed an organised child pornography group with links to other countries. Early identification of property permits more frequent and more efficient use of seizure powers and increases the subsequent effectiveness of the prosecution of offenders and the confiscation of their property.

4.2 Property seizure

Seizure of property must always be for a reason defined in law. For example, in criminal proceedings property may be seized if it is proceeds of crime, if it was used in committing a crime, if it is needed to secure a claim for compensation or if it is necessary to secure evidence. Property may also be seized in tax proceedings, in the enforcement of international sanctions and in proceedings on proof of the origin of property. The appropriateness of a property seizure, its extent, timing and other related legal and tactical aspects must be assessed, having regard for other steps in criminal proceedings, by the police officer (as a rule a Police Force investigator) managing the criminal prosecution independently or under instructions from a prosecutor (Šramel, B., 2012). The procedure for seizure of criminal property, proceeds of crime or other items is governed by the Code of Criminal Procedure.

Depending on the purpose, property seizure can be classified as:

- a seizure of moveable items and property for the compensation of injured parties – if there are grounds to suspect that an injured party’s claim for damages caused by a crime will be thwarted or obstructed, it is possible to seize property up to the probable value of the damages under Section 50(1) of the Code of Criminal Procedure. Seizure for such a claim must not include items that are exempt from enforcement of court judgements under the civil law, receivables for payment of remuneration from employment or a similar relationship, receivables for the payment of maintenance, or receivables for the payment of sickness benefit or social security benefits. If it is necessary to seize cash to secure an injured party’s claim for compensation in criminal proceedings, the procedures of Section 95 of the Code of Criminal Procedure are applied, *mutatis mutandis* (Constitutional Court of Slovak Republic, I. ÚS 122/2018). If it is necessary to seize book-entry securities to secure an injured party’s claim for compensation in criminal proceedings, the procedures of Section 96 of the Code of Criminal Procedure are applied, *mutatis mutandis*. Other provisions of the Code of Criminal Procedure relevant to securing an injured party’s claim include Section 89 handover of property, Section 90 seizure of computer data, Section 91 enforcement of seizure, Section 92 takeover of seized property and Section 99 et seq. searching of homes, persons and other premises or land.

Only the property of an accused person can be seized to secure an injured party’s claim. During the investigation phase, decisions on seizure are taken by the prosecutor at the request of the injured party, or without the injured party’s request if it is necessary for protection of the injured party’s interests, especially if there is a danger of delay.

- a seizure of property and things for the forfeiture or confiscation of property – in this case, as a rule, the accused person’s whole property is seized so that it cannot be placed outside the reach of the law enforcement authorities. If an accused person is prosecuted for a crime whose nature and gravity indicate that a sentence of forfeiture should be expected, and there is reason to fear that enforcement of the sentence could be thwarted or obstructed, a court or, during the pre-trial phase, a prosecutor may order the seizure of the accused person’s property. The seizure of an accused person’s property is regulated by Sections 94–96 of the Code of Criminal Procedure *mutatis mutandis*. Other provisions of the Code of Criminal Procedure applicable to the seizure of property for the enforcement of a sentence or protective measures include Section 425 ensuring enforcement of a sentence of forfeiture, Section 461 ensuring enforcement of forfeiture as a protective measure, Section 89 handover of property, Section 90 seizure of computer data, Section 91 enforcement of seizure, Section 92 takeover of seized property, Section 95 seizure of cash, Section 96 seizure of book-entry securities and Section 99 et seq. searching of homes, persons and other premises or land.

Section 231(g) of the Code of Criminal Procedure stipulates that only a prosecutor can order the seizure of an accused person’s property, determine which assets and things should be exempted from seizure and cancel seizure, taking such action at the proposal of a police officer acting in the case.

Proceeds of crime can be seized under a sentence of forfeiture of property, a sentence of forfeiture of goods or the imposition of forfeiture of a thing as a protective measure. Confiscation of proceeds may be linked to the award of damages to an injured party in criminal proceedings where the costs of compensation are borne by the convicted person. An analysis of court decisions in prosecutions for money laundering found that compensation was awarded in 56 cases, a fine was imposed in 27 cases and the injured party had to resort to civil proceedings in 57 cases. The imposition of a fine is a special case by which the proceeds of crime may be secured faster than by a confiscation procedure.

Only a court is entitled to decide on the imposition of fines, forfeiture of property, forfeiture of a thing or the confiscation of a thing as a protective measure.

4.3 Conclusion

Several changes in legislation have been implemented to make the identification and seizure of criminal property and its subsequent confiscation more effective. Nevertheless, organised crime has not been resting either and it is important that legislation continues to evolve to allow adequate measures to be taken. It is possible to identify several areas for improvement in Slovak law. One of these is the lack of statistics reliably quantifying proceeds of crime in a meaningful enough way. Statistics record the level of damages though reported damages are logically higher than the profits or proceeds of crime. The concept of damages also refers to benefits obtained in causal connection with a crime. Section 124(1) of the Criminal Code defines damages as harm to property or a real loss of property or rights of the injured party or any other harm caused to them in connection with a crime, regardless of whether the damage affects property or rights. Damages also refers to benefits obtained in causal connection with a crime.

Another aspect of the legal framework for the identification and seizure of criminal property where there is room for improvement is the seizure of proceeds of crime outside criminal proceedings.

The problem can be illustrated by comparison with best practices from other countries. Moldova has introduced a two-tier system of confiscation that includes both special and newly introduced extended confiscation applying to both natural and legal persons. Provisional measures are available. At an early stage of the

process, significant amounts are seized by various law enforcement authorities. Serbia considers it important to create a new police organisation to focus on the identification and seizure of property, the acquisition and allocation of information as an alternative means for more effective investigations into organised crime, corruption, money laundering and terrorist financing. Furthermore, it emphasises the importance of analytical centres, not only for general purposes but also for specific aspects of the issue under consideration (e.g. financial forensics). A noteworthy point in this context is the importance of coordination between law enforcement authorities and the prompt exchange of relevant information. It is worth highlighting alternatives that streamline work in this area, i.e. the existence of a specialised unit for the identification and seizure of property, financial investigations and comprehensive property profiling. Such a body would need to have enough training to deal with the dynamic developments in efforts to conceal criminal property outlined above, and should have its own coordination system, special analytical centre etc. Specialisation in this area would streamline the identification and seizure of criminal property and the proceeds of crime, while a secondary benefit would be more effective gathering of statistics in line with international standards in this area.

The seizure of property is also affected by the quality of legislation, its application and law enforcement authorities' procedures. Law enforcement authorities encounter problems applying the law as regards seizing property acquired with proceeds of crime by a third party, in the matter of proving reasonable grounds to suspect that an attempt has been made to obstruct identification of property, or to conceal property, and similar issues. An act on the enforcement of property seizures and the administration of seized property and amending certain acts was drafted to address some of these issues but it was not passed in the National Council of the Slovak Republic in 2019.

It must be borne in mind that every decision on the seizure of property establishes the legal basis for its de facto freezing and restrictions on its disposal, but the decision needs implementation. Implementation involves the enforcement of seizure both de jure and de facto. There is room for improvement not just in implementing decisions but also in securing property and providing for its administration. Slovakia is still in need of a specialist body to manage seized property and implement decisions concerning the property in a way that prevents its impairment. The management of real estate represents a special problem that is not regulated in enough detail, with the result that the provisions of Section 50(2) of the Code of Criminal Procedure establishing this possibility are only rarely applied in practice.

Another challenge for the future is streamlining seizure so that it can be implemented faster. There are even problems with the methods by which the relevant institutions provide and exchange information, which frequently involve use of the postal system. The planned solution to this is the creation of a central register of accounts providing information not only on the current status of accounts but also on their transaction histories. An analysis of the opportunities and potential negative impacts of FinTech measures in the Slovak property identification system is a basic prerequisite for successfully managing the introduction of new information technologies supporting business competitiveness. The use of on-line services will continue to grow in the digital economy and will increase demand for on-line identification with an awareness of the increased risk represented by transactions without direct contact. The key factors in this context are the use and reliability of electronic identification. Cooperation with digital service providers is a good way to exploit the ongoing technological development to simplify the identification and seizure of property in cyberspace.

In conclusion, it should be noted that the professional literature now takes the view that nobody should be allowed to benefit from crime (Williams, S., Hopmeier, M., Jones, R., 2018). The confiscation of proceeds of crime must consider any de facto increase in their value and such proceeds are forfeited through

value-based confiscation. Confiscation in prosecution can be based on value (value-based), property (property-based) or a mixture of the two. Professor Hopmeier emphasises that the way forward is specialisation, not just for police officers involved in financial forensics and property identification but also for investigators, prosecutors and judges. Police officers, investigators, prosecutors and judges need the right training to cope effectively with the demands of a complex process in which identification and seizure of property are the first step.

Professor Hopmeier sees a potentially advantageous approach in the civil confiscation of proceeds of crime (illicit enrichment) without prior conviction since this procedure has been authorised by the European Court of Human Rights. For example, in Ireland property acquired with proceeds of crime has been confiscated using an in rem procedure based on civil law (www.cepol.europa.eu). The advantage of this form of confiscation is that it can be applied even when the competent authority does not have sufficient evidence to bring a prosecution or is not able to clearly prove the link between income and a criminal offence of which a person is accused, as well as if a prosecution cannot be commenced or charges cannot be brought, e.g. as a result of a suspect's death.

Literature:

1. Čentěš, J.; Tuchscher, M.: *Mimotrestná úprava ochrany pred legalizáciou príjmov z trestnej činnosti a financovaním terorizmu - 1. časť* [Non-criminal regulation of protection against money laundering and terrorist financing - Part 1], In: *Justičná revue*. 2009a, Vol. 61, no 2, pp. 250-258,
2. Čentěš, J.; Tuchscher, M.: *Slovenská právna úprava zameraná proti legalizácii príjmov z trestnej činnosti a financovaniu terorizmu* [Slovak legislation aimed at combating money laundering and terrorist financing] In: *Arsnotaria*, no 1, 2009b, pp. 11-20.
3. Čentěš, J.; Mrva, M.; Krajčovič, M.: *The process of individualisation of punishment in insolvency crimes, Entrepreneurship and Sustainability Issues*, 2018, Vol. 6(2): 603-619. [http://doi.org/10.9770/jesi.2018.6.2\(10\)](http://doi.org/10.9770/jesi.2018.6.2(10))
4. Dvořák, V.: *Identifikace, klasifikace a legalizace nelegálních výnosů* [Identification, classification and legalization of illegal proceeds] In: *Policajná teória a prax*, 2006, no 3, p. 21-35
5. Chinchalad, N.: *Impact of currency regime on business companies: perception of Georgia's businessmen*. *Journal of Security and Sustainability issues*. 2020, Vol. 9 (3), [https://doi.org/10.9770/jssi.2020.9.3\(11\)](https://doi.org/10.9770/jssi.2020.9.3(11)), p. 866.
6. Klátik, J.: *Legalizácia príjmu z trestnej činnosti ako organizovaná ekonomická trestná činnosť* [The legalization of income from organized economic criminal activity]. In: Blaho, P.; Švecová, A. et. al. *Právo v európskej perspektíve*. 1. diel. [Law in a European perspective. 1. Part] - Trnava : Trnavská univerzita, Právnická fakulta, 2011, p. 310-318
7. Klímek, L.: *Legislatívne opatrenia EÚ zamerané proti praniu špinavých peňazí* [EU legislative measures against money laundering]. *Karlovarská právnická revue*, 2011, No. 2, pp. 86-96
8. Klímek, L.: *Základy trestného práva Európskej únie* [Basics of Criminal Law of the European Union]. Bratislava: Wolters Kluwer, 2017a, ISBN 978-80-816, p. 67.
9. Klímek, L.: *Mutual Recognition of Judicial Decisions in European Criminal Law*. Cham: Springer, 2017b, 742 p. ISBN 978-3-319-44375-1
10. Machová, M.: *Legalizácia príjmov/výnosov z trestnej činnosti v slovenskej a českej právnej úprave* [Legalization of proceeds / proceeds from crime in Slovak and Czech legislation]. *Trestněprávní revue*, 2017, no 7 -8, p. 175 et seq.
11. Mitsilegas, V.: *EU Criminal Law After Lisbon. Rights, Trust and the Transformation of Justice in Europe*. Oxford: Hart Publishing, 2018, 295 p. ISBN 9781849466486
12. Nováčková, D.: *Pranie špinavých peňazí* [Money laundering]. In: *SEP-časopis o slovenskom a európskom práve*, 2011, vol. 2, no 9-10, pp. 29-36
13. Púry, F.: *Poznámky k právní úpravě opatření proti legalizaci výnosů z trestné činnosti* [Comments on the legal

- regulation of measures against money laundering]. *Trestněprávní revue*, 2004, no 3, p. 74 – 80
14. Slezaková, A., Šimonová, J., Jedinák, P. et al.: *Zákon o finančnom sprostredkovaní a finančnom poradenstve [Act on Financial Intermediation and Financial Advisory Services]*. Bratislava: Wolters Kluwer, 2020, 496 p., ISBN 9788057101932
15. Stieranka, J.; Marko, M.; Backa, S.: *Legalizácia príjmov z trestnej činnosti a financovanie terorizmu : právna a inštitucionálna ochrana v Slovenskej republike [Legalization of proceeds of crime and terrorist financing: legal and institutional protection in the Slovak Republic]*. Bratislava : WoltersKluwer, 2018, 196 p. ISBN 9788081689123
16. Streinz R. et al.: *Vertrag über die Europäische Union, Vertrag über die Arbeitsweise der Europäischen Union, Charta der Grundrechte [Treaty on European Union, Treaty on functioning of the European Union, Charter of Fundamental Rights]*. München: C. H. Beck, 2018, 2873 p. ISBN 9783406694813
17. Šimonová, J.; Čentěš, J.; Beleš, A.: *Financial analysis of innovative forms of money*. *Entrepreneurship and Sustainability Issues*, 2019, 7(1): 69-80 [https://doi.org/10.9770/jesi.2019.7.1\(6\)](https://doi.org/10.9770/jesi.2019.7.1(6))
18. Šramel, B.: *Dozor prokurátora v slovenskom trestnom konaní a niektoré problematické aspekty jeho vymedzenia [Supervision of the prosecutor in Slovak criminal proceedings and some problematic aspects of its definition]*. *Trestní právo : odborný časopis pro trestní právo a obory související*, 2011, No. 10, p. 11-21.
19. Šramel, B.: *Vyšetrovatel' a policajné orgány v trestnom konaní vo svetle rekodifikovaného slovenského Trestného poriadku [Investigator and police authorities in criminal proceedings in the light of the recodified Slovak Criminal Procedure Code]*. *Kriminalistika : čtvrtletník pro kriminalistickou teorii a praxi*, 2012, No. 1, p. 59-66
20. Vondráčková, A. 2016. *Boj proti praní peněz [Fight against money laundering]*. Prague: Charles University in Prague, Faculty of Law, 94 p. ISBN ISBN 9788087975497
21. Williams, S.; Hopmeier, M.; Jones R.: *Millington and Sutherland Williams on The Proceeds of Crime*. Oxford: OUP, 2018 ISBN 978-0198758150.

Primary Paper Section: A

Secondary Paper Section: AG, AH

COMMUTING TO WORK VERSUS E-COMMUTING: DATA FROM AN AUSTRIAN COMPANY IN PRE-COVID-19 ERA, DURING 1ST LOCKDOWN, AFTER EASING AND DURING 2ND LOCKDOWN

^aMICHAL BEŇO

*Institute of Technology and Business in České Budějovice, 370
01 České Budějovice, Czech Republic
email: "beno@mail.vstecb.cz"*

Abstract: As a result of restrictions introduced to slow the spread of Covid-19, the number of commuters has significantly decreased and e-commuters increased. This analysis is based on Austrians who had a job prior to the pandemic and who were still working during the survey (whether they worked from home or commuted). Using data from the survey, this article examines changes in the mode of workplace of those who switched to e-commuting. Additionally, the authors were interested in finding out to what extent the e-commuting agreement reduces commuting. The following were done: a systematic review of e-commuting literature, a cross-tabulation of data to examine relationships within data, a McNemar test for workplace examination and a Friedman test with pairwise comparisons for commuting analysis. The data show that the number of e-commuters increased in almost all the surveyed periods except between the pre-Covid time and the easing of the lockdown. The e-working proportion increased on average by 59.74%. Results suggest that the frequency of commutes by cubicles differs significantly in all periods except between the first and second lockdowns, and by e-workers between February and the first lockdown and the easing and the second lockdown. If we look at the average rankings, we see that during the second lockdown, the frequency of cubicle commutes decreased significantly and that of e-workers increased.

Keywords: commuting, e-commuting, pre- and post-Covid-19, Austria.

1 Introduction

During the entire history of humankind, location dependency was the key for getting a job. This means that a lack of technological advancement prevented the work environment from being flexible. Humans moved from the Stone Age (hunting, gathering, preparing food, constructing human artefacts) to social groups, through agriculture (farming) and different industrial revolutions (physical power) to the modern information and communication technology (ICT) age (Beno, 2018). Before the 19th century, most workers lived less than a one-hour's walk from their workplace (Mauss et al., 2016). The industrial revolution, and the industrious revolution (De Vries, 1994), moved people from their home to workplaces, now people are able to move back to their homes (Simitis, 1986).

When traffic congestion, rail fare increases, the cost of petrol, air pollution, commuting time increases and many other factors are taken into consideration, commuting seems to be a far from stress-free experience. Commuting (travelling to work in general) places a disproportionate burden on the transport network, physical (Künn-Nelen, 2016; Sugiyama et al., 2016; Tsuji and Shiojima, 2015) and mental health (Hilbrecht et al., 2014; Sugiyama et al., 2016; Wener and Evans, 2011), work performance (Grinza and Rycx, 2020; Künn-Nelen, 2016; Nomoto et al., 2015; Steinmetz et al., 2014) and social participation (Delmelle et al., 2013; Mattison et al., 2015; Newman et al., 2014; Sandow, 2011).

Commuter behaviour is undergoing a change with regard to modes of commuting, increases in commuting distance and duration, time of day for commuting and increased congestion. Commuting time from the home to the workplace has been increasing (Lorenz and Goerke, 2015; Roberts and Taylor, 2017). In 2018, more than one in five European workers spent 90 minutes or more of their time travelling to and from work. On average, European workers spend 1 hour and 24 minutes a day commuting, travelling 28.56 km in total (SD Worx, 2018). But 70% of Europeans think their commute has a good ecological footprint, despite cars being the kings of the commute (SD Worx, 2019). Many Austrians are struggling to find work in the rural heartland and are being forced to commute long distances. Most employers say this is not their problem (Cermak, 2014). The number of commuters in Austria made up 2.2 million of the roughly 4 million employed people, i.e. more than a half (Statistik, 2020). Furthermore, 220 000 Austrians commute 40 km per day and almost 60 000 of them 100 km or more every day (Wolf-Eberl and Posch, 2018). Such long commutes and the

high number of weekly working hours raise questions about safety, health, productivity and a good work-life balance.

E-commuting has the potential to address problems of congestion, pollution, work-life-balance, productivity and lack of housing affordability. It reduces the need to travel to cubicles primarily through the utilisation of modern ICT. Simply, it is working from different places on a full (hybrid) or part-time basis. But Covid-19 has had a dramatic impact on how people and businesses operate day-to-day, not least in how they approach travelling to and from places of work. Different efforts to contain the disease have had an instant and unprecedented effect on working patterns all over the world, with the lockdown restrictions and increased e-commuting reducing the use of car journeys and the demand for public transport.

Looking back, the Covid-19 pandemic, and the measures designed to tackle it, have had a dramatic effect on workplace activities. As Covid-19 spread, increased social distancing, higher uncertainty and the lockdowns reduced outside activities. The focus of this project was to explore employees' cubicle and e-commuting workplace activities in a surveyed country in the pre-Covid-19 time, during the first lockdown, the easing of the lockdown and during the second lockdown. Additionally, we were interested in finding out to what extent the e-commuting agreement reduces commuting. One of the reasons for many companies to implement e-commuting is to exercise corporate social responsibility, but also because it reduces the overall transmission of the disease.

The following section provides an account of the e-commuting concept. The third section briefly outlines the methodology used in this research. The fourth section gives a short overview of the results and closes with a discussion. The last section gives the conclusions.

2 E-commuting

The idea of working at a distance arose in the 1970s (Nilles et al., 1976) during the oil crises (Scholefield and Peel, 2009). Since then, the term varies within the existing literature. "Since the idea of telecommuting has been around for decades now, it makes sense that new words and phrases would come to replace what is, in theory, a not-so-new workplace concept" (Parris, 2018). Over the years, researchers used different terms to indicate e-commuting, such as teleworking, remote working, nomadic working, mobile working and e-working. These terms do not always have the same meaning of the concept of e-commuting. Fonner and Roloff (2010) state that employees work principally from home, but teleworking is not limited to home-based work and includes working from a variety of other locations, such as telecentres and call centres. Basically, e-commuting means the utilisation of ICT rather than commuting to work (Beňo and Ferenčíková, 2019). It has become apparent that there are many ways in which teleworking can be practised, and so a more detailed breakdown of the term is needed. The definition varies from country to country, industry sector, time and place, but includes three common principles. Telecommuting involves (1) members of an organisation, (2) performing their regular work away from the central workplace at a remote location, (3) while using technology to complete the work (Pinsonneault and Boisvert, 2001).

E-commuting, formerly e-working, has increased over the last years, enabled by modern technology. Telework increased slowly in the 11 years before the appearance of Covid-19 (Eurostat, 2021a). E-commuting has been connected with staying at home to work on major projects/tasks for the company. With the arrival of Industry 4.0 and advanced ICT it became increasingly possible to meet the work requirements without needing to spend so much time in traffic, and it allowed more work flexibility. There are two types of e-commuters: those who commute to

cubicles once or twice a week or fully e-workers who do not commute at all.

In choosing the type of commuting model, commuters are assumed to evaluate the attributes of the different transport options available to them and to choose the type of transport mode that will provide them with maximum utility (Ortúzar and Willumsen, 2011). However, it has also been posited that commuting behaviour is habitual and that changes of the type of commuting is more likely at the time of major life events, such as moving house, changing jobs, relationship breakdowns or the birth of a child (Clark et al., 2016). Recent data show that the effect of teleworking on commuting is driven by occupations in which teleworking has grown. Therefore, policymakers should be aware that the effects differ between intellectual and manual occupations (De Vos et al., 2019).

E-commuting is seen as a tool for reducing the environmental and socio-economic impact of transport and mobility patterns on society (Beño, 2021; Cerquiera et al., 2020; Hynes, 2014; Kitou and Horwath, 2006; Van Lier et al., 2014) and reducing distances and number of trips (Balepur et al., 1998; Choo et al., 2005; Ravalet and Rérat, 2019). Previously, e-commuters made significantly fewer and shorter trips than non-teleworkers (Eldér, 2020).

3 Material and Methods

3.1 Procedure

The authors of the paper regard the literature review as a critical, analytical account of the existing research on a particular topic. Firstly, the authors present their own discussion of the existing literature on e-commuting. Secondly, a descriptive empirical analysis is used. Data analysis consists of descriptive statistics and other quantitative measures in analysing particular issues and questions.

3.2 Participants

Research was performed following a quantitative approach, drawing from a sample of 154 individual employees in Austria. Our survey started at the end of February 2020; 154 employees were selected, made up of 34 e-workers (20 male and 14 female) and 120 cubicle workers (68 male and 52 female). In Table 1, we provide further socio-demographic data.

Table 1: Socio-demographic characteristics, N = 154

Variable		Cubicles	E-workers
		N=120	N=34
Sex	Male	68	20
	Female	52	14
Age	20-29	28	3
	30-44	38	12
	45-59	37	19
Marital status	Single (divorced, separated)	67	22
	Married/partnership	53	12
Parity	Children in household	99	29
	Childless	21	8

This work was developed to provide a better understanding of workplace changes and employees' commuting before Covid-19 (28.02.2020), during the first lockdown (31.03.2020), after the easing of the lockdown (29.05.2020) and during the second lockdown (30.11.2020) in relation to the future impact on the face-to-display workplace in an Austrian company. In the first stage of our survey, we identified cubicle workers and e-workers. Secondly, we examined the commuting trend and time saved by not commuting. As this data collection was done solely for this international company, ethics approval was not required.

The e-mail questionnaire contained several types of questions (in English) for respondents to answer. The following variables were used: cubicles, e-commuting in the pre-Covid era, during the

first lockdown, after the easing of the first lockdown, second lockdown. The study was conducted regardless of gender, however both genders participated in our research. The participants came from Austria, from towns and cities, from suburbs and the countryside. Respondents' ages ranged from 20 to 59 (see Table 1).

The sample was a heterogeneous group of professionals working in several areas, including the following: customer services, accounting, electronic data processing, research and development, marketing and logistics. Responses to the questionnaires were anonymous.

There is a reliability risk with e-mail questionnaires. It is more difficult to guarantee their anonymity. The respondents might be concerned about the information they have provided being misused. To assure them that this would not happen, the authors of the paper proceeded as follows. First, the confidential nature of their responses was emphasised in the questionnaire invitation. This also contained a description of the mechanism which was then executed. We used trusted software which did not allow linking identifiers with their responses. Their ID and responses were stored in different files. Then, the authors made certain that all IP addresses, e-mail data, and other person-related data were not archived.

3.3 Data Collection and Analysis

In the first stage, we used a cross-tabulation of the data to examine relationships within the data. In the second stage of our analysis, we used the McNemar test to determine the consistency in the responses across two variables. We tested two workplace changes to determine whether there is a significant difference between the proportion of workers working from home and those working from cubicles in all four examined periods. In the next step, we examined commuting. We used the Friedman test with a pairwise comparison to determine whether there is a difference between the commuting of workers and e-workers during the examined periods.

4 Commuting versus e-commuting: Looking Back and Looking Forward, Survey Results

Austria is widely recognised among EU and OECD countries (EFI, 2020) as having highly flexible labour markets. Additionally, Austria is rated as having the 29th most efficient labour market in the world (Schwab, 2019). In general, flexible labour markets tend to have higher employment rates and more skilled employees, and consequently lower unemployment. But working from home is suddenly the new normal as many employers and employees try to keep operating under the social distancing restrictions. Austria has, like many other countries, effectively closed down entire sectors of its economy and severely limited activity in many other sectors. The following paragraphs provide an overview of the findings from the quantitative component of the research study.

4.1 Workplace Formation

The Covid-19 pandemic has changed the ways and the places where people work. The number of people choosing to work remotely is increasing slowly in the European Union (Eurostat, 2021b). How many employees were working from home in the pre-Covid period? Before the lockdown, work carried out in cubicles (77.92%) exceeded the rate of e-workers (22.08%). During the first lockdown there were 92.21% e-workers, after the easing of the first lockdown (cubicles – 42.86% to e-workers – 57.14%) and in the second lockdown (cubicles – 32.47% to e-workers – 67.53%) the employed population was exclusively working at home (see Table 2).

Table 2: Socio-demographic characteristics, N = 154

Variable	Before Covid-19	1 st lockdown	Easing of restrictions	2 nd lockdown
	%	%	%	%
Cubicle-centred workers	77.92	7.79	42.86	32.47
E-workers	22.08	92.21	57.14	67.53

Based on the study data, the lockdown restrictions by the government of Austria show a high growth of e-working (shift to working from home). This confirms the statement that greater technological connectivity facilitates this process by enabling work to be carried out wherever workers happen to be and whatever the time of day (Messenger and Gschwind, 2016). Research carried out before the lockdown shows that e-working was more prevalent as a special privilege among male employees, but during and after the lockdown it was a necessity for everybody. This confirms Beno's survey data that telework is a male-dominated working method (Beno, 2019). Nearly four in 10 people in the EU began working from home as a result of the Covid-19 pandemic (Eurofound, 2020).

Our evidence, using the McNemar test, shows that there is a significant difference in the distribution of jobs (Chi-Square tests marked in bold), except in the pre-Covid and the easing of the lockdown periods (see Table 3a-f).

Table 3a-f: Workplace* period cross-tabulation and Chi-Square tests.

a) Workplace* period cross-tabulation

Count	Period			
	February	During 1 st lockdown	Total	
Workplace	Cubicles	120	12	132
	E-workers	34	142	176
	Total	154	154	308

Chi-Square tests	Value	Exact Sig. (2-sided)
	McNemar test	
N of valid cases	308	

b) W2* Period Cross-tabulation

Count	Period			
	February	Easing lockdown	Total	
Workplace	Cubicles	120	66	186
	E-workers	34	88	122
	Total	154	154	308

Chi-Square tests	Value	Exact Sig. (2-sided)
	McNemar test	
N of valid cases	308	

c) W2* period cross-tabulation

Count	Period			
	February	During 2 nd lockdown	Total	
Workplace	Cubicles	120	50	170
	E-workers	34	104	138
	Total	154	154	308

Chi-Square tests	Value	Exact Sig. (2-sided)
	McNemar test	

N of valid cases 308

d) Workplace* period cross-tabulation

Count	Period			
	During 1 st lockdown	Easing lockdown	Total	
Workplace	Cubicles	12	66	78
	E-workers	142	68	230
	Total	154	154	308

Chi-Square tests	Value	Exact Sig. (2-sided)
	McNemar test	
N of valid cases	308	

e) Workplace* period cross-tabulation

Count	Period			
	During 1 st lockdown	During 2 nd lockdown	Total	
Workplace	Cubicles	12	50	62
	E-workers	142	104	246
	Total	154	154	308

Chi-Square tests	Value	Exact Sig. (2-sided)
	McNemar test	
N of valid cases	308	

f) Workplace* period cross-tabulation

Count	Period			
	Easing lockdown	During 2 nd lockdown	Total	
Workplace	Cubicles	66	50	116
	E-workers	88	104	192
	Total	154	154	308

Chi-Square tests	Value	Exact Sig. (2-sided)
	McNemar test	
N of valid cases	308	

According to the data, there are significant differences in the proportion of workers in the office and at home during all four periods. Over the course of the surveyed periods, the e-working proportion increased on average by 59.74%. Briefly, this surge in e-working occurred during the 1st lockdown (92.21%) and 2nd lockdown (67.53%).

4.2 Commuting versus e-commuting

Given its importance, commuting to/from work plays a central role in daily mobility planning, and thus the analysis of commuting behaviour is important for the correct design of mobility policy. Commuting time has been extensively studied in the past, and some level of consensus has been achieved in different settings (Giménez-Nadal et al., 2020). In 2019, more than half (61.3%) of employed people in the EU travelled less than 30 minutes from home to work, i.e. commuted one-way and without any detours. Employed people in Austria averaged 25 minutes of commuting time (Eurostat, 2020). Undoubtedly, one of the greatest conveniences of not working in cubicles is the absence of a daily commute (Beno, 2018b; Chatterjee et al., 2017; Gajedran and Harrison, 2007; Nilles et al., 1976; Nilles, 1997; Raišienė et al., 2020).

In accordance with the obtained survey data of all periods, all commuters prefer cars over public transport because the public transport network tends to be inefficient, and in the Covid-19 period the risk of infection makes employees avoid public transport. The exodus from public transport to private cars and to some extent bicycles is in line with existing evidence (Molloy et al., 2020). International comparisons of the impact of Covid-19 on mobility have so far been based on data from mobility service providers such as Google Maps, Apple Plans, Citymapper, Waze and Moovit. However, our analysis is based on commuters' data. In the pre-Covid-19 period, those who covered relatively longer distances (average one-way distances of 20 km by rail and 50 km by car) were given the flexibility to work remotely. During other periods, commuting decreased rapidly and e-commuting increased.

4.2.1 Cubicles

The P-value of the test is lower than the chosen level of significance, so we reject the null hypothesis of frequency difference in commuting in the given four periods. This confirms that there is a significant difference in the frequency of commuting between at least one pair of given periods (see Table 4).

Table 4: Hypothesis test summary

Null hypothesis	Test	Sig.	Decision
The distributions of February, 1st, easing and 2nd are the same.	Related-samples Friedman's two-way analysis of variance by ranks	0.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is 0.05.			

The following graph describes the distribution of the data and their average order (nonparametric tests are based on the order of the value and not on the values themselves). The table shows the test results (see Figure 1 and Table 5).

Figure 1. Related-samples Friedman's two-way analysis of variance by ranks

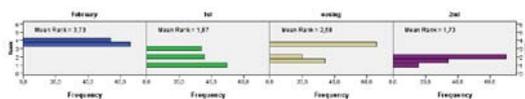


Table 5: Test results

Total N	120
Test statistic	214.812
Degrees of freedom	3
Asymptotic Sig. (2-sided test)	0.000

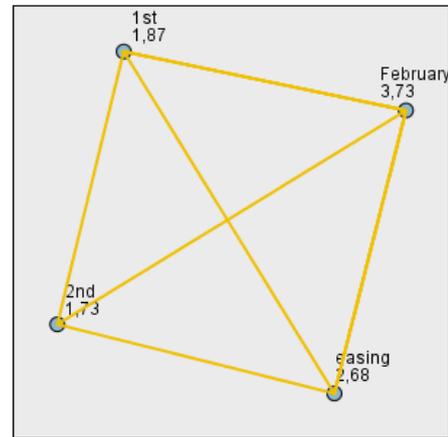
Significantly different periods are marked in bold (see Table 6). We see, for example, that the frequency of commutes differs especially between February and the first and second lockdowns. If we look at the average rankings, we see that during the second lockdown, the frequency of commutes decreased significantly (see Figure 2).

Table 6: Pairwise comparisons

Sample1-Sample2	Test statistic	Std. error	Std. test statistic	Sig.	Adj. Sig.
2 nd - 1 st	0.142	0.167	0.850	0.395	1.000
2nd - easing	0.958	0.167	5.750	0.000	0.000
2nd - February	2.000	0.167	12.000	0.000	0.000

February					
1st - easing	-0.817	0.167	-4.900	0.000	0.000
1st - February	1.858	0.167	11.150	0.000	0.000
Easing - February	1.042	0.167	6.250	0.000	0.000

Figure 2. Pairwise comparisons



4.2.2. E-workers

The P-value of the test is lower than the chosen level of significance, so we reject the null hypothesis of frequency difference in commuting in the given four periods. This confirms that there is a significant difference in the frequency of commuting between at least one pair of given periods (see Table 7).

Table 7: Hypothesis test summary

Null hypothesis	Test	Sig.	Decision
The distributions of February, 1st, easing and 2nd are the same.	Related-samples Friedman's two-way analysis of variance by ranks	0.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is 0.05.			

The following graph describes the distribution of the data and their average order (nonparametric tests are based on the order of the value and not on the values themselves). The table shows the test results (see Figure 3 and Table 8).

Figure 3. Related-samples Friedman's two-way analysis of variance by ranks

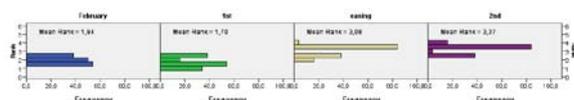


Table 8: Test results

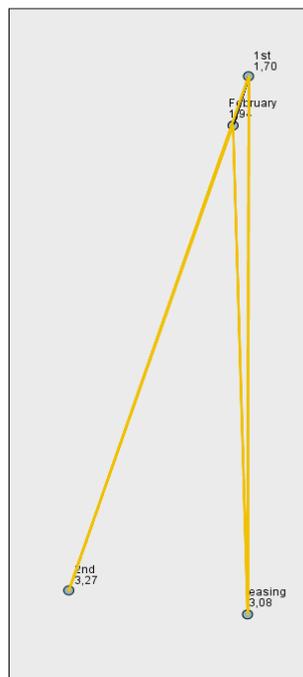
Total N	142
Test statistic	270.888
Degrees of freedom	3
Asymptotic Sig. (2-sided test)	0.000

Significantly different periods are marked in bold (see Table 9). We see, for example, that the frequency of commutes differs especially between the first and second lockdowns, the first lockdown and the easing and between February and the second lockdown. If we look at the average rankings, we see that during the second lockdown, the frequency of commutes increased (see Figure 4). E-workers typically commute longer than average commutes of cubicles but this does not necessarily mean that e-commuting encourages more remote living.

Table 9: Pairwise comparisons

Sample1-Sample2	Test statistic	Std. error	Std. test statistic	Sig.	Adj. Sig
1 st - February	0.239	0.153	1.563	0.118	0.709
1st - easing	-1.373	0.153	-8.963	0.000	0.000
2nd - 1st	-1.570	0.153	-10.250	0.000	0.000
Easing - February	-1.134	0.153	-7.400	0.000	0.000
2nd - February	-1.131	0.153	-8.687	0.000	0.000
2 nd - easing	-0.197	0.153	-1.287	0.198	1.000

Figure 4. Pairwise comparisons



5 Discussion

Reducing the frequency of commuting will reduce vehicle miles travelled, lowering emissions, but also reducing population centralisation as people move out to the suburbs (Bento et al., 2005). Another convenience for the employee of working from home is saving time in commuting to the office, avoiding rush-hour traffic and stress. Ford and Butts (1991) claim that eliminating the stresses of driving in rush hour traffic may represent the most important advantage for many employees. Wienclaw (2019) indicates that by not commuting, employees will have more free-time to spend with their families. A recent Upwork survey reveals that since the pandemic started US workers have saved more than \$90 billion from not commuting (UpWork, 2020).

According to our data, the increase in e-commuting means fewer workers commuting to work. Prior to the pandemic, the car (60%) was the most common mode of transportation to work,

followed by public transport (22.5%) and active transportation (walking or cycling) (17.5%). Many Austrian employees were still working from home during the easing of the lockdown (57.14%) and in the 2nd lockdown (67.53%), and this mostly explains why fewer workers were using cars instead of public transport. Additionally, people turn to cars because of fears of coronavirus infection on public transport. Will the daily commute be the same? Will the coronavirus reverse healthier commuting? Will working from home be here to stay forever? Guyot and Sawhill (2020) emphasise that e-commuting was usually rare in the past, but is now a necessity. The authors further believe that e-commuting will probably continue long after the pandemic. Our findings confirm that hybrid working might be the future of work. E-commuting two days a week will be optimal for balancing collaborative and quiet work, while benefiting from the reduced stress of less commuting. The e-commuting proportion increased on average by 59.74%.

6 Conclusion

This pandemic has had a remarkable impact on how employees and employers operate regularly, not least in how they approach travelling to and from places of work. Covid-19 has had an immediate and unprecedented effect on working patterns, with the lockdown restrictions, social distancing and increased working from home significantly reducing commuting to/from work.

According to our data, the crisis has demonstrated that employers and employees in an Austrian company adapted quickly to change. In this paper, we examined commuter types, the degree to which they worked in different workplaces and how they cope with working remotely. Furthermore, the commuting variability of individuals (by car, by rail, by foot and by bicycle) was studied during four periods. Our analysis used a systematic literature review for e-commuting, a cross-tabulation of data to examine relationships within the data, the McNemar test for workplace examination and the Friedman test with pairwise comparisons for commuting analysis.

The results indicate the direct implications of e-commuting and commuting. Some of the commuting changes will be temporary, reflecting the pandemic situation. But others will be more permanent, and they will reflect an acceleration of workplace transformation and changes to the way we work. It appeared that there was a decline in the number of trips to/from work, but the average distance travelled has increased, and it is likely that the trip lengths for e-workers are longer than the average. These trips are car-dependent, and the travel frequency to/from work is increasing. The importance of e-commuting for business is becoming more apparent. Results indicate that the frequency of commutes by cubicles differs significantly in all periods, except between the first and second lockdowns, and by e-workers between February and the first lockdown and the easing and the second lockdown. If we look at the average rankings, we see that during the second lockdown, the frequency of cubicle commutes significantly decreased and that of e-workers increased. Those who worked remotely in the pre-Covid-19 period were male. The potential for increase is substantial, on average by 59.74%.

As lockdown restrictions ease and more areas of economy restart or expand, new challenges will arise in relation to the increasing number of trips. An increase in non-work related trips, car-dependency, e-commuters' consumption and occupations may negate any benefits (Büttner and Breitkreuz, 2020; Cerqueira et al., 2020; De Vos et al., 2019; Ellđer, 2020; He and Hu, 2015; Stiles and Smart, 2020; Zhu and Mason, 2014). In future research, answers should be sought to the question of whether additional trips that are undertaken as a result of e-commuting should be included as this is a form of induced travel that is common in transport. This additional travel takes place because the car is now needed at the home for other uses.

As this paper argues, we have a unique opportunity to bring about change in relation to commuting and e-commuting, and this should not be squandered.

- Leisure Journal*, vol. 52, no. 2/2014, pp. 151-163. <https://doi.org/10.1080/16078055.2014.903723>
31. Hynes, M.: Telework Isn't Working: A Policy Review. *Economic and Social Review*, vol. 45, no. 4/2014, pp. 579-602.
32. Kitou, E., & Horwath, A.: Transportation Choices and Air Pollution Effects of Telework. *Journal of Infrastructure Systems*, vol. 12, no. 2/2006, pp. 121-134. [https://doi.org/10.1061/\(ASCE\)1076-0342\(2006\)12:2\(121\)](https://doi.org/10.1061/(ASCE)1076-0342(2006)12:2(121))
33. Künn-Nelen, A.: Does Commuting Affect Health? *Health Economics*, vol. 25, no. 8/2016, pp. 984-1004. <https://doi.org/10.1002/hec.3199>
34. Lorenz, O., & Goerke, L.: Commuting and Sickness Absence. *Jahrestagung des Vereins für Socialpolitik 2015: Ökonomische Entwicklung – Theorie und Politik –Session: Empirical Studies*, vol. 5, no. G16-V4/2015.
35. Mattison, K., Hakansson, C., & Jakobsson, K.: Relationships Between Commuting and Social Capital Among Men and Women in Southern Sweden. *Environment and Behaviour*, vol. 47, no. 7/2015, pp. 734-753. <https://doi.org/10.1177/00139161514529969>
36. Mauss, D., Jarzoc, M. N., & Fischer, J. E.: Daily commuting to work is not associated with variables of health. *Journal of Occupational Medicine and Toxicology*, vol. 11, no. 12/2016, pp. 1-5. <https://doi.org/10.1186/s12995-016-0103-z>
37. Messenger, J., & Gschwind, L.: Three Generations of Telework: New ICT and the (R)Evolution From Home Office to Virtual Office. *New Technology, Work and Employment*, vol. 31, no. 3/2016, pp. 195-208. <https://doi.org/10.1111/ntwe.12073>
38. Molloy, J., Tehervankov, Ch., Schatzmann, T., Schoeman, B., Hintermann, B., & Axhausen, K. W.: MOBIS-COVID19/08: Results as of 25/05/2020 (Post-lockdown). Available at: <https://doi.org/10.3929/ethz-b-000416869>
39. Newman, B. J., Johnson, J., & Lown, P. L.: The "Daily Grind": Work, Commuting, and Their Impact on Political Participation. *American Politics Research*, vol. 42, no. 1/2014, pp. 141-170. <https://doi.org/10.1177/1532673X13498265>
40. Nilles, J. M.: Telework: Enabling Distributed Organizations. *Information Systems Management*, vol. 14, no. 4/1997, pp. 7-14. <https://doi.org/10.1080/10580539708907069>
41. Nilles, J. M., Carlson, R. F., Gay, P., & Hanneman, G. J.: *The Telecommunications-Transportation Tradeoff. Options for Tomorrow*; Wiley: New York, USA, 1976.
42. Nomoto, M., Hara, A., & Kikuchi, K.: EFFECTS OF LONG-TIME COMMUTING AND LONG-HOUR WORKING ON LIFESTYLE AND MENTAL HEALTH AMONG SCHOOL TEACHERS IN TOKYO, JAPAN. *Journal of Human Ergology*, vol. 44, no. 1/2015, pp. 1-9. https://doi.org/10.11183/jhe.44.1_1
43. Ortúzar, J. d. D., & Willumsen, L. G.: *Modelling Transport*, 4th ed. John Wiley & Sons, Ltd.: USA, 2011, 607 p.
44. Parris, J.: Remote Work or Telecommute: What's the Difference, 2018. Available at: <https://www.workflexibility.org/remote-work-vs-telecommute-whats-the-difference/>
45. Pinsonneault, A., & Boisvert, M.: The impacts of telecommuting on organizations and individuals: A review of the literature. *Telecommuting and virtual offices: Issues and opportunities*, 2001, pp. 163-185.
46. Raišienė, A. G., Rapuano, V., Varkulevičiūtė, K., & Stachová, K.: Working from Home - Who Is Happy? A Survey of Lithuania's Employees during the COVID-19 Quarantine Period. *Sustainability*, 12, no. 13/2020, 5332. <https://doi.org/10.3390/su12135332>
47. Ravalet, E., & Rérat, P.: Teleworking: decreasing mobility or increasing tolerance of commuting distances? *Built Environment*, vol. 45, no. 4/2019, pp. 582-602. DOI: 10.2148/benv.45.4.582
48. Roberts, J., & Taylor, K.: Intra-Household Commuting Choices and Local Labour Markets. *Oxford Economic Papers*, vol. 69, no. 3/2017, pp. 734-757. <https://doi.org/10.1093/oep/gpw037>
49. Sandow, E.: *On the road - Social aspects of commuting long distance to work*. Umeå: Kulturgeografiska institutionen, Umeå universitet, 2011, 55 pp.
50. Scholefield G., & Peel S.: Managers' attitudes to teleworking. *New Zealand Journal of Employment Relations*, vol. 34, no.3/2009, pp. 1-13. ISSN: 1176-4716.
51. Schwab, K.: The Global Competitiveness Report 2019, 2019. Available at: http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf
52. SD Worx: More than 20 % of Europeans Commute at Least 90 Minutes Daily, 2018. Available at: <https://www.sdworx.com/en/press/2018/2018-09-20-more-than-20percent-of-europeans-commute-at-least-90-minutes-daily>
53. SD Worx: Nearly three-quarters of European employees think their commute has a good ecological footprint, 2019. Available at: <https://www.sdworx.com/en/press/2019/2019-09-10-nearly-three-quarters-of-european-employees-think-their-commute>
54. Simitis, S.: The Juridification of Labour Relations. *Comparative Labor Law*, vol. 93, no. 2 1986, pp. 93-142.
55. Statistik: Erwerbstätige 2009 bis 2019 nach Entfernungskategorie, 2020. Available at: http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/bevoelkerung/volkszaehlungen_registerzaehlungen_abgestimmte_erwerbsstatistik/pendlerinnen_und_pendler/078510.html
56. Steinmetz, S., De Vries, D. H., & Tjeldens, K. G.: Should I stay or should I go? The impact of working time and wages on retention in the health workforce. *Human Resources for Health*, vol. 12, no. 23/2014. <https://doi.org/10.1186/1478-4491-12-23>
57. Stiles, J., & Smart, M. J.: Working at home and elsewhere: daily work location, telework, and travel among United States knowledge workers. *Transportation*, 2020. <https://doi.org/10.1007/s11116-020-10136-6>
58. Sugiyama, T., Wijndaele, K., Koohsari, M. J., Tanamas, S. K., Dunstan, D.W., & Owen, N.: Adverse associations of car time with markers of cardio-metabolic risk. *Preventive Medicine*, vol. 83, 2016, pp. 26-30. <https://doi.org/10.1016/j.pmed.2015.11.029>
59. UpWork: Where Remote Work Saves Commuters Most, 2020. Available at: <https://www.slideshare.net/upwork/where-remote-work-saves-commuters-most>
60. Tsuji, H., & Shiojima, I.: Commuting by Public Transportation is Associated With Lower Prevalence of Excess Body Weight, Hypertension, and Diabetes. *AHA Journal*, vol. 132, no. 3/2015, A15214.
61. Van Lier, T., De Witte, A., & Macharis, A.: How worthwhile is teleworking from a sustainable mobility perspective? The case of Brussels Capital region. *European Journal of Transport and Infrastructure Research*, vol. 14, no. 3/2014. <https://doi.org/10.18757/ejtir.2014.14.3.3033>
62. Wener, R. E., & Evans, G. W.: Comparing stress of car and train commuters. *Transportation Research Part F: Traffic Psychology and Behaviour*, vol. 14, no.2/2011, pp. 111-116. <https://doi.org/10.1016/j.trf.2010.11.008>
63. Wienclaw, R. A.: Telecommuting. *Salem Press Encyclopedia*, 2019. Available at: <http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=ers&AN=89163905>
64. Wolf-Eberl, S.; & Posch, P.: Arbeitswege und Arbeitszeit für mein Leben?, 2018. Available at: <https://emedien.arbeiterkammer.at/viewer/ppresolver?id=AC15225562>
65. Zhu, P., & Mason, S. G.: The impact of telecommuting on personal vehicle usage and environmental sustainability. *International Journal of Environmental Science and Technology*, vol. 11, 2014, pp. 2185-2200. <https://doi.org/10.1007/s13762-014-0556-5>

Primary Paper Section: A

Secondary Paper Section: AE, AH, AP

INFLUENCE OF SOCIAL MEDIA ON THE EFFECTIVENESS OF PUBLIC HEALTH CAMPAIGNS AGAINST THE SPREAD OF COVID-19

^aHASAN BEYARI

*Department of Administrative and Financial Sciences
Makkah Community College, Umm Al-Qura University, PO Box
715, Saudi Arabia.
email: ^ahmbeyari@uqu.edu.sa*

Abstract: The increasing spread of the Covid-19 pandemic is paralleled by increasing use of social media for general, positive or negative influences. A systematic review was attempted to evaluate the extent to which research has been done on the three categories of influence of social media and the nature of influence. A search of Google Scholar using the topic of the review itself as the search term, including abstracts also, yielded 32 papers, of which 30 were reviewed under the three categories. More than half of the selected papers were published on the negative influence of social media. Mis (dis) information dominated among the types of negative influences discussed. Many of the papers in all the three categories discussed a few factors related to the observed results. In the case of negative influence, suggestions were given to mitigate the negative influence. This research has implications for policymakers and people/organisations responsible for running public health campaigns on social media.

Keywords: Social Media, Public Health Campaign, Covid-19, Pandemic

1 Introduction

Both positive and negative influence of social media in all spheres of life are well known. It is so in the case of the current Covid-19 pandemic also. In the still rapidly increasing scenario of Covid-19 in many countries, it is critical to provide precise information on symptoms, personal protection methods, and methods to prevent spread among the public and other related aspects. Many times, public health authorities communicate this information through social media. On many occasions, administrators of social media pick up these authentic messages on Covid-19 for spreading across the community officially for the broader public good. In a third way, people post messages related to Covid-19, which may be authentic or spurious or self-made. When the information spread through social media is not based on public health authorities, there is a risk of the information being unauthentic, false and harmful. It is common to spread information which looks scientific but without proper evidence. Some of them may even cite authentic sources for such unsubstantiated information. People may post their own beliefs or forwarded messages on what they believe to be true either due to ignorance or purposefully to create harm. All these and more about these dimensions were discussed in a review by Sahni and Sharma (2020).

2 Global relevance of internet and social media

Social media have become agents of fast communication due to rapidly increasing usage of the internet, mobile devices and social media. Some latest data on internet usage given by ITU (2019) is presented in Fig 1.

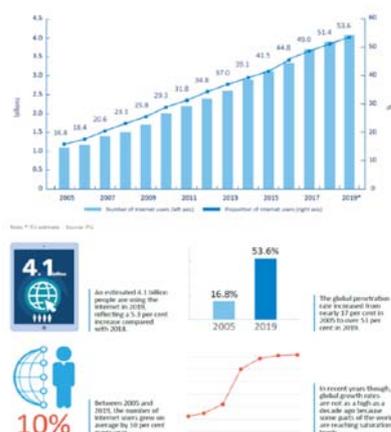


Figure 1 Internet usage trends in the world 2005-2019 (ITU, 2019).

World over, the internet usage steadily increased from 1.2 billion in 2005 (about 17%) to about 4.1 billion people in 2019 (about 54%) of the total population representing an annual growth rate of over 10%. With the increase in internet usage, mobile cellular and active mobile broadband usage also increased at the rate of about 18% annually. Thus, the increase in mobile use has outpaced the growth in internet usage.

The fastest growth can be observed in the case of the spread of social media across all populations in the globe. Some interesting statistics about social media were given by Smith (2019). Out of a global population of about 7.8 billion, about 4.5 billion use internet, 3.75 billion of them are active social media users. Almost 7.5 social media accounts are used per person, and on an average, each user spends about 142 minutes per day in using them. About ten new social media users are added each second. Facebook and WhatsApp are the most popular social media accounting for about 60 billion messages a day and still growing. These facts adequately prove the extent of positive or negative influence social media can exert on the general public.

In this structured review, an attempt is made to evaluate how effective is public health campaigns against Covid-19 under the influence of social media. Both positive and negative influences will be included in the review.

3 Methodology

Google Scholar was used for the search using the topic itself as the search phrase so that papers directly dealing with the topic can be selected easily. Only English language papers were selected. In addition to full papers, abstracts were also included if they contained useful information.

The search yielded 32 usable papers, of which two were used above. The rest 30 selected papers were primarily divided into general, positive influence, negative influence for review of associated aspects. The results of this method of structured review are discussed in the aforementioned sections.

4 Results

As will be evident from the number of papers in the following sections tabulated in Table 1, the frequency of publications was highest in the case of the negative influence of social media.

Table 1. Frequency and percentage of papers used in the sections of this review.

Influence of social media	Number of papers	Percentage
General	7	23%
Positive	7	23%
Negative	16	54%
Total	30	100

Research papers reporting the negative influence of social media comprised more than half of the total number of papers reviewed. Papers of general nature and on positive influence were almost equal in the frequency of about 20-23%.

4.1 General

In this section, papers which cannot be categorised as reporting either positive or negative influences or those which discuss both influences are included. The frequencies of these subcategories are presented.

Table 2. Frequencies of subcategories

General/Non-categorical	Number of papers	Percentage
Beneficial and harmful	4	55%
Non-categorical	2	30%
Nothing specific	1	15%

Both beneficial and harmful influences were reported in more than half the papers reviewed. Two papers generally discussed social media influences. One paper did not say anything specific about positive or negative social media influences.

Social networks can spread either harmful or beneficial behaviours through the network to friends of different layers of relationship (Van Bavel, et al., 2020). Therefore, the need for relying more on the information from authentic public health sources rather than social media or through a general search of the internet was stressed by Li, et al. (2020).

COVID-19 tweets in the United States are largely influenced by political polarisation. Partisan attitudes were correlated with sentiment toward government measures and the tendency to share health and prevention messaging. Crudeological interactions were also observed, and this trend was altered by user segregation and polarised network structure. There was a correlation between user engagement with topics related to public health and the varying impact of the disease outbreak in different states. In this respect, Jiang, Chen, Yan, Lerman, and Ferrara (2020) suggested calibration of online platforms to evaluate the effectiveness of public health campaigns. This will help to assess how the state and national level corona policies were received by people. Still, it will be challenging to implement effective prevention strategies across the country, paving the way for almost permanent pockets of high infection rates.

The more positive and crucial role of social media can be beneficial in promoting public health campaigns. However, the effectiveness of this role is met with challenges of posts containing misinformation, lack of guidance, and information leakage. This can be countered only by public health authorities using social media to a large extent for promoting trust, building solidarity of the public with government efforts, reducing confusion and chaos, educating the public on preventive measures and reducing the medical load in sites with limitations of medical facilities (Bao, Cao, Xiong, & Tang, 2020).

Seeing is believing, and the effect of visual media is much more textual messages. Here, social media like YouTube become relevant. In a study, Basch, et al. (2020) found that out of 100 most widely viewed YouTube videos related to Covid-19 over 125 million times, less than one-third dealt with topics related to prevention behaviours listed by US Centre for Disease Control and Prevention website. Thus, an essential opportunity for prevention of the Covid-19 spread was missed.

Twitter is now fast becoming choice social media gaining from leaders like Facebook or WhatsApp. In Twitter, anxious posts related to the spread of the coronavirus is rapidly increasing. Government and health officials select replying only to tweets less troublesome for them. This leaves crucial questions unanswered leaving people more anxious. Governments and their health authorities are content with regular updates on new cases, samples tested, contacts traced, and changes in containment zones. Strategies being followed to contain and control the virus are also posted, but not with adequately clarity to reduce the worries of social media users. Tweets by people show that their worries are centred on the virus contagion, prevention and the economy. However, the tone of official tweets may or may not be soothing enough to assure people that everything is under control. Also, the official tweets may or may not capture the response of public Twitter users to official communications to remove their worries (Rao, Vemprala, Akello, & Valecha, 2020).

Investigations on the content of most-read state-owned newspaper in China, People's Daily posted in an online social media, Sina Weibo by Ngai, Singh, Lu, and Koon (2020) revealed the dominance of non-narrative style in the content frames related to action, new evidence, and reassurance in COVID-19 communication by the government. Posts related to new evidence and a non-narrative style negatively predicted the number of shares. Disease prevention posts delivered in a narrative style were generated the highest number of shares. In an interaction effect, the use of a narrative style in disease prevention posts generated positive comments and likes by the Chinese public and links to external sources enhanced sharing.

4.2 Positive

There were only seven papers out of 30 discussing the beneficial influence of social media. This may mean, either there only very few beneficial influences or research work on beneficial effects are rare, as finding fault is more accessible and more interesting even to researchers. Five of these papers discussed only the direct positive influences true to the section topic. The remaining two discussed some negative influences as also existing but highlighting positive influence. Since there were only two subcategories, no tabulated data is given.

The coronavirus spreads from person to person. In the networks, the centrally located people come into contact with more people and thus, are among the first to be infected. However, the very same central people can slow down the disease by spreading positive interventions like hand washing and physical distancing through public demonstrations. Misperceptions can be corrected to change behaviours through positive public messages of health-promoting norms. Messages from in-group models, influential members of the community, maybe most effective (Van Bavel, et al., 2020).

The success of Vietnam in containing Covid-19 pandemic was, to some extent, due to positive contribution of social media. Facebook and Zalo are the two most popular social media in the country. These media were used to project healthy practices to contain the virus through messages and videos by celebrities. Contributions by them to increase healthcare facilities were also projected (La, et al., 2020).

From a survey of social media users, Al-Dmour, Salman, Abuhashesh, and Al-Dmour (2020) noted positive influence of social media on public health protection against COVID-19 in Jordan. Public health awareness and public health behavioural changes acted as mediators of this effect. The usefulness of mediators in promoting public health awareness and protection of citizens through social media was suggested for practice.

Analysis of Twitter posts in South Korea by Park, Park, and Chong (2020) revealed faster spread and more frequent communication of information in Corona networks than in others. Majority of the content was related to the positive roles being played by individuals and groups, directing attention to the crisis, ethical issues like deviant behaviour among the population and celebrity donations. News in portals was used more frequently than news in nonportal sites. Medically-related tweets were more popular than non-medical tweets.

In Jordan, the use of social media platforms positively influenced public health protection against COVID-19. This relationship was mediated by public health awareness and public health behavioural changes. The recommendation is increased use of social media for enhancing awareness and adoption of recommended guidelines by public health authorities in Jordan (Al-Dmour, Masa'deh, Salman, Abuhashesh, & Al-Dmour, 2020).

The thematic analysis of English tweets during the late half of March 2020 by Thelwall and Thelwal (2020) revealed identified the themes covered in the tweets to be lockdown life, attitude towards social restrictions, politics, safety messages, people with COVID-19, support for key workers, work and COVID-19 facts and news. Twitter played a positive role through official tweets,

sharing of social distancing information and helping others to follow social distancing, criticisms of government responses and helping each other to adjust with social isolation. There were some popular tweets not supporting social distancing, but they seemed to make little impact on the positive effects.

One positive effect of Covid-19 has been recognition, promotion and campaigning for physical activity on a global scale as lack of physical activity is a threat to even general health and is particularly relevant due to movement restrictions and social distancing requirements of the pandemic period. Social media are widely used both by governments and physical activity enthusiasts to spread the message and teach methods of physical activity while following the guidelines. Physical activity is the only reason for people to go out in this period (Levinger & Hill, 2020).

4.3 Negative

Out of 30 reviewed papers, 16 dealt with negative influences of social media. This may be indicative of the natural human tendency of finding fault or high research interest in finding out what went wrong to account for the rapid increase in Covid-19 cases in many countries. The frequencies of papers discussing different types of negative influences of social media are presented in Table 3.

Table 3. Frequencies of different types of negative influences of social media in reviewed papers.

Type of negative influence	Number of papers	Percentage
Misinformation/disinformation	8	15.4
Fake news	2	3.8
Panic	2	3.8
Fear	4	7.7
Uncertainty of future	4	7.7
Racism	4	7.7
Hate speech	3	5.8
Rumours	4	7.7
Conspiracy theories	3	5.8
Hiding real information	1	1.9
Inadequacies	1	1.9
Factors related	8	15.4
Prevention methods given	8	15.4
Total	52	100.0

Note: Total number is higher than 16 because more than one type of influence is discussed in most papers.

More papers dealt with mis (dis) information. Factors affecting and some suggestions for prevention of negative influence of social media were also given by many papers. According to Depoux, et al. (2020), coincidence of virology and virality caused the spread of misinformation and panic through social media faster than the rapidly spreading Covid-19 pandemic itself. Metonymic substitution of incidents and places with restaurants, tourists, products was a specific component of such misinformation. Viral racism against the Chinese and anything associated with them even remotely and later extension of these to all that is Asian were noted. Such negative messages through social media harmed appropriate response to the outbreak. It was also observed that panic created in social media by misinformation, hate speech, rumours, conspiracy theories, fear, racism and mass purchase of face masks, travelled and spread across the world faster than the coronavirus itself.

Negative use and its impact of social media were also noted in Vietnam, more frequently, fake news about celebrities being in physical contact with celebrities. The government intervened to stop these negative impacts by banning fake and harmful news in social media and heavy punishment to those involved (La, et al., 2020).

The negative effects of misinformation and rumours about Covid-19 symptoms, aetiology, effects, cure and prevention in hiding real information through social media were discussed by

Tasnim, Hossain, and Mazumder (2020). Prevention of such harmful behaviour is possible only through collaborative efforts of public health authorities, the government and the social media as a group and launch of common platforms for accurate information to the public.

Negative effects of social media infodemic on creating and spreading fear and panic among people of the Kurdistan region of Iraq were reported by Ahmad and Murad (2020). Mental health and psychological well-being or people were affected due to fear and panic. Psychological anxiety was higher among the youth of 18-35 years. Facebook was the most popular media in the region, and messages of fear and panic were posted mainly in this social medium. Gender, age and level of education had a limited effect on the relative use of various social media and therefore impacted also.

Based on the results of a survey in Finland, Farooq, Laato, and Islam (2020) noted that frequent use of social media resulted in information overload and overconcern among individuals. Lowering the perceived cost of responses of preventive measures stressing on the seriousness of the situation can increase the motivation of people to adopt preventive measures such as self-isolation and wearing masks.

Social media are rich in posts of life-endangering consequences of supposed cures, misleading rumours, and conspiracy theories about the origin of coronavirus. These rumours are dangerous and are circulated all over the world. Some of these posts are associated with racism and meant to create fear among the mass. The new infodemic systems are characterised by the several ways of communication between people in which social media occupies a vital place. When misinformation is shared, the harm done surpasses that of coronavirus itself. These social media contain unproven, false techniques to mitigate exposure and infection with misleading information and instruction for individuals to stock up on supplies and food. There is an urgent need to assess the awareness of the public towards the dangerous impact of the spread of misinformation, which can only aggravate the situation (Radwan & Radwan, 2020).

Movement restrictions and social distancing requirements have forced people to rely on social media to maintain connectivity. This is exploited by influential peers to share the information which is not authentic. Sometimes, wrong information is shared unknowingly as in the case of messages forwarded a close friend requesting the apparently 'useful' information for 'everyone's benefit'. When such false information is shared repeated by several people across social media, it is perceived as truth. Thus people become vulnerable to a new digital false reality. A mixture of authentic information from public health authorities and false information spread through social media leads to confusion among people as they tend to compare them and accept what appeals to them as true, often the wrong ones. This confusion leads to a lack of public trust, consensus and prevents positive action from controlling spread by the people.

The term 'infodemic' is used to denote the flood of misinformation, disinformation, rumours and false news in the guise of authentic information (sometimes, this information are shown as the statements of some famous authority, whereas in reality, there had been no such statements), the sources of which are difficult to identify. Along with the exponential growth of the COVID-19, the unchecked and rapid spread of misinformation, primarily through social media, is becoming a serious public health challenge for COVID-19 control and mitigation measures (Limaye, et al., 2020). High levels of misinformation about the origin of the coronavirus were also noticed among Portuguese Facebook users, and the frequency of misinformation was higher among those with lower educational attainment (Morinha & Magalhães, 2020).

Considerable public health concerns arise from the currently trending anti-vaccination campaigns through social media, as they threaten even the development of vaccines against coronavirus. This type of vaccine hesitancy affects the public confidence in future vaccine development against novel

pathogens including COVID-19 (Puri, Coomes, Haghbayan, & Gunaratne, 2020).

Types of messages which contain malicious propaganda consisting of hate speech, disinformation, and misinformation are posted in social media to exploit the multiverse of online to spread hate very quickly beyond the control of the administrators of social media platforms. Increasingly coherent, rapidly evolving hate speech content weaponising hate communities, is noticeable. A generalised form of the public health research organisations predicting the point at which the tilting for the multiverse-wide viral spreading of hate speech was modelled. New policies may be required to mitigate the global spread of malicious COVID-19 content, and these policies need not rely on coordination between all online platforms (Velásquez, et al., 2020).

The spread of COVID-19 has led to racism, hate and xenophobia against the Chinese and the broader Asian communities. Spread of both racial hate and counter hate speech to mitigate the spread of racism are seen in social media. Unfortunately, hateful bots had been more successful in attracting followers compared to counter hate bots. Analysis of the social network reveals extensive interaction and engagement between hateful and counter hate users instead of existing in isolated polarised communities. Hate is more contagious, and nodes become more hateful when exposed to more hateful content. In general, counter hate messages can discourage users from turning hateful in the first place (Ziems, He, Soni, & Kumar, 2020).

Social media platforms contain numerous bots that can automatically amplify certain topics of discussion compared to others. A study of 43.3 million English tweets about COVID-19 provided early evidence regarding the use of bots to promote political conspiracies in the United States, sharply contrasting with non-automated posts by persons focusing on public health concerns (Ferrara, 2020).

Covid-19 causes fear, which is aggravated by misinformation and misconceptions carried by social media. The negative influence of social media enhances the psychological distress of individuals as the pandemic spreads rapidly (Lin, Broström, Griffiths, & Pakpour, 2020).

Low confidence and lack of mutual trust between countries and peoples is a fertile environment for the spread of rumours and conspiracy theories through social media. Lack of authoritative scientific consensus on the virus, its spread, and containment and its' long term social and economic ramifications fuel these rumours and theories. Some examples of such trends are: 5G network activates the virus, the pandemic is a hoax perpetrated by a global cabal, the virus is a bio-weapon released deliberately by the Chinese or Bill Gates is using it for the covert launch a global surveillance regime. Although many people immediately see the true nature of these posts, events such as destruction of property, racially induced attacks against the Chinese and Asian Americans, and demonstrations of resistance to public health orders prove the need to address them sternly.

Computer tools could identify the vulnerable parts of social media posts, and appropriate actions can be initiated against the culprits (Shahsavari, Tangherlini, & Roychowdhury, 2020).

In an analysis of twitter posts during January-April in USA, Wang, Hao, and Platt (2020) found inconsistencies and incongruencies on four critical topics, spatial disparities, problems in timeliness and sufficiency across actors and message types in communicating COVID-19. The network analysis also reveals increased communication coordination over time. These findings could help in future crisis communications on any pandemic or other types of crisis to the public by the government.

5 Conclusion

The above-systematic review shows that negative influence dominates the impact of social media on public health

campaigns. Within negative influence categories, mis (dis) information dominated over other types. In all categories of papers, many of them suggested preventive methods to reduce negative influence and strategies to promote positive influence.

This research has implications policymaker and people/organisations responsible for running public health campaigns on social media.

Literature:

- Ahmad, A. R., & Murad, H. R. (2020). The impact of social media on panic during the COVID-19 pandemic in Iraqi Kurdistan: online questionnaire study. *Journal of Medical Internet Research*, 22(5), e19556. doi:10.2196/19556
- Al-Dmour, H., Masa'deh, P. R., Salman, P. A., Abuhashesh, D. M., & Al-Dmour, D. R. (2020). The Influence of Social Media Platforms on Public Health Protection against Coronavirus (COVID-19) Pandemic Disease via the Mediating Effects of Public Health Awareness and Behavioral Change: An Integrated Model. *Journal of Medical Internet Research*, 22(8), e19996. doi:10.2196/19996.
- Al-Dmour, H., Salman, A., Abuhashesh, M., & Al-Dmour, R. (2020). Influence of Social Media Platforms on Public Health Protection Against the COVID-19 Pandemic via the Mediating Effects of Public Health Awareness and Behavioral Changes: Integrated Model. *Journal of Medical Internet Research*, 8, e19996. doi:10.2196/19996
- Bao, H., Cao, B., Xiong, Y., & Tang, W. (2020). Digital Media's Role in the COVID-19 Pandemic. *JMIR mHealth and uHealth*, 8(9), e20156. doi:10.2196/20156
- Basch, C. H., Hillyer, G. C., Meleo-Erwin, Z. C., Jaime, C., Mohlman, J., & Basch, C. E. (2020). Preventive behaviors conveyed on YouTube to mitigate transmission of COVID-19: cross-sectional study. *JMIR public health and surveillance*, 6(2), e18807. doi:10.2196/18807
- Depoux, A., Martin, S., Karafillakis, E., Preet, R., Wilder-Smith, A., & Larson, H. (2020). The pandemic of social media panic travels faster than the COVID-19 outbreak. *Journal of Travel Medicine*, 27(3), taaa031. doi:10.1093/jtm/taaa031
- Depoux, A., Martin, S., Karafillakis, E., Preet, R., Wilder-Smith, A., & Larson, H. (2020). The pandemic of social media panic travels faster than the COVID-19 outbreak. *Journal of Travel Medicine*, 4 PP. doi:10.1093/jtm/taaa031
- Farooq, A., Laato, S., & Islam, A. N. (2020). Impact of online information on self-isolation intention during the COVID-19 pandemic: cross-sectional study. *Journal of medical Internet research*, 22(5), e19128. doi:10.2196/19128
- Ferrara, E. (2020). # covid-19 on twitter: Bots, conspiracies, and social media activism. *arXiv*, 25(6), 25 pp. doi:10.5210/fm.v25i6.10633
- ITU. (2019). *Measuring digital development: Facts and Figures*. ITU. Retrieved September 19, 2020, from <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2019.pdf>
- ITU. (2019, December 20). *Statistics*. Retrieved June 2, 2020, from International Telecommunication Union: <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>
- Jiang, J., Chen, E., Yan, S., Lerman, K., & Ferrara, E. (2020). Political polarisation drives online conversations about COVID-19 in the United States. *Human Behavior and Emerging Technologies*, 2(3), 200-211. doi:10.1002/hbe2.202
- La, V.-P., Pham, T.-H., Ho, M.-T., Nguyen, M.-H., Nguyen, K.-L. P., Vuong, T.-T., . . . Vuong, Q.-H. (2020). Policy response, social media and science journalism for the sustainability of the public health system amid the COVID-19 outbreak: The vietnam lessons. *Sustainability*, 12(7), 2931. doi:10.3390/su12072931
- Levinger, P., & Hill, K. D. (2020). The Impact of Mass Media Campaigns on Physical Activity Participation on a Global Scale: Lessons Learned From the COVID-19 Pandemic. *Journal of Physical Activity and Health*, 17(9), 857-858. doi:10.1123/jpah.2020-0387
- Li, W., Liao, J., Li, Q., Baskota, M., Wang, X., Tang, Y., . . . Fukuoka, T. (2020). Public health education for parents during the outbreak of COVID-19: a rapid review. *Annals of translational medicine*, 8(10), 628. doi:10.21037/atm-20-3312

16. Limaye, R. J., Sauer, M., Ali, J., Bernstein, J., Wahl, B., Barnhill, A., & Labrique, A. (2020). Building trust while influencing online COVID-19 content in the social media world. *The Lancet Digital Health*, 2(6), e277-e278. doi:10.1016/S2589-7500(20)30084-4
17. Lin, C.-Y., Broström, A., Griffiths, M. D., & Pakpour, A. H. (2020). Investigating mediated effects of fear of COVID-19 and COVID-19 misunderstanding in the association between problematic social media use, psychological distress, and insomnia. *Internet interventions*, 21(September), 100345. doi:10.1016/j.invent.2020.100345
18. Morinha, F., & Magalhães, P. (2020). Genomics, social media and the novel coronavirus pandemic, COVID-19. *Journal of Global Health Reports*, 4, e2020032. doi:10.29392/001c.12836
19. Ngai, C. S., Singh, R. G., Lu, W., & Koon, A. C. (2020). Grappling With the COVID-19 Health Crisis: Content Analysis of Communication Strategies and Their Effects on Public Engagement on Social Media. *Journal of Medical Internet Research*, 22(8), e21360. doi:10.2196/21360
20. Park, H. W., Park, S., & Chong, M. (2020). Conversations and medical news frames on twitter: Infodemiological study on covid-19 in South Korea. *Journal of Medical Internet Research*, 22(5), e18897. doi:10.2196/18897
21. Puri, N., Coomes, E. A., Haghbayan, H., & Gunaratne, K. (2020). Social media and vaccine hesitancy: new updates for the era of COVID-19 and globalised infectious diseases. *Human Vaccines & Immunotherapeutics*, 1-8. doi:10.1080/21645515.2020.1780846
22. Radwan, E., & Radwan, A. (2020). The Spread of the Pandemic of Social Media Panic during the COVID-19 Outbreak. *European Journal of Environment and Public Health*, 4(2), em0044. doi:10.29333/ejeph/8277
23. Rao, H. R., Vemprala, N., Akello, P., & Valecha, R. (2020). Retweets of officials' alarming vs reassuring messages during the COVID-19 pandemic: Implications for crisis management. *International Journal of Information Management, In press*, 102187. doi:10.1016/j.ijinfomgt.2020.102187
24. Sahni, H., & Sharma, H. (2020). Role of social media during the COVID-19 pandemic: Beneficial, destructive, or reconstructive? *International Journal of Academic Medicine*, 6(2), 70-75. doi:10.4103/IJAM.IJAM_50_20
25. Shahsavari, S. P., Tangherlini, T. R., & Roychowdhury, V. (2020). Conspiracy in the time of corona: Automatic detection of covid-19 conspiracy theories in social media and the news. *arXiv*, 13783 v1(April), 21 pp. doi:10.21203/rs.3.rs-52079/v1
26. Smith, K. (2019, December 30). *126 Amazing Social Media Statistics and Facts*. Retrieved September 30, 2020, from Brandwatch: <https://www.brandwatch.com/blog/amazing-social-media-statistics-and-facts/>
27. Tasnim, S., Hossain, M. M., & Mazumder, H. (2020). Impact of rumors or misinformation on coronavirus disease (COVID-19) in social media. *Journal of preventive medicine and public health*, 53(3), 171-174. doi:10.3961/jpmph.20.094
28. Thelwall, M., & Thelwal, S. (2020). Retweeting for COVID-19: Consensus building, information sharing, dissent, and lockdown life. *arXiv*, 17 pp. Retrieved October 2, 2020, from <https://arxiv.org/ftp/arxiv/papers/2004/2004.02793.pdf>
29. Van Bavel, J. J., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., & Crockett, M. J. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour*, 4(April), 460-471. Retrieved August 27, 2020, from <https://www.nature.com/articles/s41562-020-0884-z>
30. Velásquez, N., Leahy, R., Restrepo, N. J., Lupu, Y., Sear, R., Gabriel, N., Johnson, N. F. (2020). Hate multiverse spreads malicious COVID-19 content online beyond individual platform control. *arXiv*, 2004(V2), 00673. Retrieved October 2, 2020, from <https://arxiv.org/ftp/arxiv/papers/2004/2004.00673.pdf>
31. Wang, Y., Hao, H., & Platt, L. S. (2020). Examining risk and crisis communications of government agencies and stakeholders during early-stages of COVID-19 on Twitter. *Computers in Human Behavior*, 114(January), 106568. doi:10.1016/j.chb.2020.106568
32. Ziemis, C., He, B., Soni, S., & Kumar, S. (2020). Racism is a Virus: Anti-Asian Hate and Counterhate. *arXiv*, 12423(v1), 11

pp. Retrieved October 2, 2020, from <https://arxiv.org/pdf/2005.12423.pdf>

Primary Paper Section: A

Secondary Paper Section: AJ

NON-MUSICAL MARKERS OF THE STRUCTURE AND CONTENT OF MUSICAL WORKS AT THE END OF THE 20TH CENTURY

^aBOGDAN SIUTA, ^bIRYNA DOVHALYUK, ^cOLENA MARKOVA, ^dIRYNA ZINKIV, ^eULIANA HRAB

^a*Department of Music and Performing Arts, Kyiv Academy of Arts, Kyiv, Ukraine,* ^b*Department of Ukrainian Folklore Studies Lviv National University named after Ivan Franko, Lviv, Ukraine,* ^c*Department of Theoretical and Applied Musicology, Odessa National A.V. Nezhdanova Academy of Music, Odessa, Ukraine,* ^d*Department of Music Theory, Lviv National Musical Academy named after Mykola Lysenko, Lviv, Ukraine,* ^e*Department of Musical Medieval Studies and Ukrainian Studies, Lviv National Musical Academy named after Mykola Lysenko, Lviv, Ukraine*
 email: ^a*theodotius@i.ua,* ^b*iradovhalyuk@gmail.com,* ^c*dashaelena@gmail.com,* ^d*i.zinkiv@gmail.com,* ^e*ulya.hrab@gmail.com*

Abstract: Today, non-musical factors have become one of the dominant factors in the organization of artistic integrity and, in particular, the formation of meanings in music. They are considered, as a rule, in a broad socio-cultural context, where every modern musical text exists as artistic and aesthetic integrity. The necessity for a detailed study of signs and means of communication of non-musical nature, which are widely used in music along with specifically musical means of communication, now appears as an urgent theoretical and methodological problem. The main purpose of this study – to highlight and prove the effectiveness of non-musical factors of communication that are used in musical texts, their role in the processes of encoding-decoding of the meaning series, and reference links, which allow these creative processes.

Keywords: Music, Signs, Musical Text, Decoding, Symbol

1 Introduction

Activation of innovative, experimental and creative solutions in world and Ukrainian musical creativity of the end of the XX century caused a remarkable increase in attention to the role and place of non-musical factors in the organization of musical texts. Relevant research is conducted on the basis of intensification of other theoretical musicological problems, such as: development of various aspects of the theory of musical interpretation and decoding of the content of musical works V.G Ivanchenko (2004), M. Kovalinas (2002, 2004), V. Moskalenko (2002a, 2002b), A. Stashevsky (2004). As well as the beginning of a profound study of various components and principles of functioning of the musical text O. Garmel (2003, 2004), M. Kovalinas (2001), O. Kozarenko (2000a, 2000b), I. Kokhanyk (2001, 2003), E.A. Moreva (2002), I. Pyaskovskiy (2001), A. Samoylenko (2002), I. Yudkin-Ripun (2002) and others. Scientists also study kinesics and gestures in the context of paraphrasing, which in fact are non-musical factors G.V. Kolshansky (2014), B.O. Syuta (2010, 2011), R.S. Hatten (2004), M. Imberty (2005), A. Cox (2016) and others.

Studying the modern style of the 20th century “modern” we mean not the measure of the novelty of a particular work, but its appearance in the postmodern era. Postmodernism is often viewed by philosophers and culturologists as a transitional “protostyle”. It is a protostyle for the yet unknown cultural epoch of the future. Still, it defines the stylistic face of today music. A lot of researchers think that the most eloquent and convincing characteristic of the postmodernism is “the principle of construction, collection of everything and everything, up to the combination of the incompatible” that was considered in this period (Rozhnovsky, 2001). Non-musical factors of different nature in this principle of musical mixing not only occupy a prominent place, but also take over the functions of axiological markers: “non-musical values can practically be no less important than musical, music in general” (Kholopov, 1982).

Therefore, their effectiveness is not limited to the fact that they significantly affect certain types and forms of artistic expression. They are also able to in some way influence the organization of the meaning of musical works, adjust its dependence on the dominant creative and socio-cultural (or – according to C.

Dahlhaus (1974) – aesthetic and social) paradigms that are decisive for a particular era, period, style, direction, etc. Extremely noticeable is the correlation of the choice of the dominant principles of organization of musical works and the purpose for which a particular work is written: liturgical or representative, experimental or entertaining, arranging or pedagogical. To practically illustrate this thesis, let us recall two popular compositions that were created in one country almost simultaneously. They received superlative characteristics from both narrow specialists and listeners/ fans. These compositions still remain among the brightest representatives of modern national music – the song “Colored Fairs” M. Rodovich and “The Conqueror Worm” on the plot of E.A. Poe for K. Knittel tape. Comparing them, we can determine the degree of influence of extramusical factors in the organization of the work in the context of modern discursive practices.

These works originated in 1976-1977 in Poland. In both cases, their authors successfully used the expressive means of synthesized and electro-acoustically processed sound (the exception is the synthesizer. In the first case a set of folk-rock-combo instruments was used, in the second – a violin and a trombone). Both works had a wide and positive publicity, sounded at concerts. These works were distributed in the form of numerous audio recordings. Both are well known and highly regarded even four decades after their writing. The aim of their creation and non-musical (including economic and social) functions are radically different (in the first case it is entertaining mass music production, in the second – experimental e-music). Moreover, the principles chosen by the authors for the organization of works as a work of art in terms of content and form are also significantly different. And even similar principles of formation – two parts of variant-verse “chant-chorus” in the song M. Rodovich and open form of a similar type, which loosely simulates the structure of the poem by E.A. Poe, do not correspond to each other. The influence of non-musical factors on these works (we also mean different socio-cultural functions, series of involved content, factors of economic nature, conditions of performance and reproduction) was decisive here.

2 Materials and Methods

The problem under study is the insufficient study of signs and means of communication of a non-musical nature in the music of the 20th century. The tendency to simplify the usage of the system of communicative codes often intersects with the consonant tendencies of related spheres of the humanities in the modern situation of complex information messages, including in art. It is made to borrow the symbolic resources used in them. On the one hand, in music this causes the growing role of multimedia ways of forming meanings, and, on the other hand, the widespread usage of expressive and symbolic means of non-musical nature in the system of musical resources. Non-musical factors in the formation and establishment of the content of musical works have always occupied a prominent place in the composition process. Although the ways of composing music are constantly changing, evolving, improving, the intensity of the influence of these extramusical factors on the process of creating and perceiving music remains unchanged.

The role of the word (in the format of the word series, the form-forming basis, the guiding name, the epigraph, etc.) has always been and still is especially noticeable in these processes. Equally important, especially since the eighteenth century, were the factors of socio-economic nature (music publishing industry, concerts, audio and video recordings, the institute of copyright and related rights, the dependence of the functioning of musical works on marketing research and sales industry, globalization trends, etc.). Still, for almost a whole millennium – from *Ars antiqua* until the XXI century – the evolution of European professional music took place in the direction of forming self-sufficient methods of organizing artistic integrity on the basis of

intramusical patterns. The role of non-musical gradually became more subordinate, official, and finally, according to M. Mikhailov (1990), narrowed to the artist perception of the surrounding reality and its reflection in the work.

The situation began to change dramatically in the twentieth century, especially with the advent of modern music in modern culture. And in the mid-70s of the twentieth century C. Dahlhaus (1974) was talking about the most important trends in the organization of artistic content and form in music, highlighting "increasingly clear normative interdependence between non-musical functions and musical and technical knowledge that were gained in the result of long experience" and drawing clear parallels between the current realities and the situation in European music to the eighteenth century. Among the decisive counterpoints of these processes in music, he sees the inseparable unity of the nature of content, type of formation, principles of structural organization and program, or "sound" (the same), which is actually a link between purely musical and historically and socially determined factors – "aesthetic and social characteristics" (Dahlhaus, 1974). The hypothesis of our research is the idea that non-musical markers can be expressive elements of intermediate works.

3 Results and Discussion

The role of non-musical elements of speech in the process of organizing an artistically coherent musical work emerges especially clearly if we consider the work as a text that is fully realized only in the process of "reading" and after its completion. In this case, each byte of information received by the listener from the non-musical series of the text or formed as a result of the reconstruction of reference connections, in particular the construction of intertextual figures, becomes extremely important. The work of K. Penderecki – "Threnody for the Victims of Hiroshima" is very indicative in this respect (Kovalinas, 2004), which got its name entirely by accident – due to a change in the original – "8'37'", which meant the duration of the work (many listeners will certainly remember in this regard, "4'33" J. Cage). A "purely musical" composition in the style of Xenakis "Metastasis" or "Pytopractic", organized by means of comparison and connection of commensurate sonorous segments of the two main sound types and different mass saturation, with the "chronometric" name would be perceived as a successful imitation. sense even epigony) music of the Greek composer. The changed name added new meaningful impulses to the musical text. Before listening to the work, the prepared listener builds semantic and connotative connections between the symbols that correlate with the tragedy of the inhabitants of Hiroshima that is still fresh in the minds of contemporaries and the vicissitudes of the personal drama of the outstanding Polish poet-humanist of the XVI century J. Kokhanowski. (having lost his daughter, he in his "Trainings" gave this tragic event a truly Shakespearean expression).

So, by actualizing the cultural context of the last 400 years of world history, the composer not only transformed the semantic field of the work, but without changing an iota in the musical text, immensely enriched its reference potential and possibilities of actualization of subtextual meanings that did not exist in this composition. Accordingly, the listener approaches to the organization of artistic integrity have changed: the dominant factors are now clearly updated series of meanings, which are "extracted" properly due to the new title, which has become an integral and meaningful component of the text created by these precedent phenomena.

The illustrative object of our reflections is also the famous work of the British composer A. Panufnik – 12 evocations for 12 string instruments "Arbor cosmica". It is composed in the form of a clearly structured system, the internal logic of which follows the structure of the tree. Its implementation is necessarily accompanied by acquaintance with the author annotation, which explains the idea, the principles of construction of the work, the peculiarities of its structuring. The name of the composition implies going beyond the fixed musical text and determines the

construction of intertextual figures. In each case it increases the initial semantic volume to a much wider scale. Thus, the introduction of the word "tree" in the name of the symphony can stimulate the emergence of connotative connections with the well-known in many nations folk and mythological symbol of the "world tree". The inclusion of such an intertextual figure in the main text of the work will not contradict the author intention at all. It will even strengthen it to some extent. The Latin name can also intensify the effectiveness of musical communication, actualizing in the role of performers the isometric motet of Philip de Vitry "Tuba sacre fidei – In arboris – Virgo sum". This leads to a more productive semantic development of numerous interpreters related to the cultural and historical realities of the early fourteenth century. In all these cases, the contextual part in the perception of the work differs significantly from the originally predicted by the composer (it is worth paying tribute to the thesis of R. Barthes (1989) on the "Death of the Author"). So, in any of the described versions of A. Panufnik text the final type of organization of it as an artistic whole will be different.

Of course, the performer of a musical work is at the same time a kind of co-author of the composer, as he adds information "from himself" to the text. The crucial role here is played by the implementation of various precedent situations, personal knowledge of native speakers of a particular musical language, accumulating their previous experience and acquaintance with the necessary range of precedent texts. These "carriers" are also listeners of the work ("readers of the text"). It is also believed that the interpreter enriches the work to the greatest extent with contextual and subtextual information and the subtextual part of it is actually actualized in the process of interpretation. Most often the subtext is embedded in the musical text at the stage of the author idea and the implementation of this subtext directly depends on the degree of actualization of the previous experience of the listener, features of discursive practices and epistemological situation at the time of perception of the text (ie from the ability to actualize the general array of knowledge accumulated by the cultural era: the thesaurus in the context of a particular episteme). From this point of view, E. Sati well-known cycles are convincing samples of musical texts of the twentieth century – "Three Pieces in the Shape of a Pear", "Dried Embryos" and "Three Real Faded Preludes". Decoding of the contents hidden in them begins with actualization of the subtext that is put in their names. After all, the obvious meaning of these names is virtually meaningless: it is unlikely that the preludes will fade; no one would think of drying out any embryos and no one would decide whether to write as many as three plays in the same pear shape.

It is clear that the pragmatics of these titles is to push the listener to actualize the subtext embedded in them as part of the musical text of the works. This subtext has a distinctly non-musical nature and exists in the text as a potential possibility that may or may not be realized. In any case, it affects the further reading and decoding of the text. After all, regardless of whether the listener knows about the sharp criticism of the composer for the inadequacy of the form of his works and about a kind of artistic and parody "response" to this criticism with three plays, the form of which is written too clearly in the title, he will try to update certain codes, which, in his opinion, should be implicitly presented in the text of the work. Unknown context and subtext through the use of available non-musical information, which may be relevant to the text (biographical information about the composer, his worldview, environment, style of work, information about other works by the same author, etc.), partially reconstructed and are connected in the usual triad context-text-subtext. The subtext may remain uncoded or be replaced by a constructed listener, depending on the explanations used by him. This will determine the ways of organizing the semantic field of a musical work.

The usage of non-musical factors in the role of subtle explications of the author idea is easy to trace on the example of Game of Cards "by K. Tsepkoenko", Homo ludens 1-5 "by V. Runchak and others". It is interesting, for example, that the names of the cycles of K. Tsepkoenko and V. Runchak quite

transparently outline a number of non-musical references, which significantly change the nature of the semantic integrity of the works. And the name of the quintet for tenor saxophone, voice, piano, violin and cello K. Tsepkenko suggests perceiving this work without minimal acquaintance with the theoretical calculations of the doctrine of the language of M. Marr means to reduce a number of values laid down in it by the composer (Stashevsky, 2004).

The listener, who tries to perceive K. Tsepkenko "Game of Cards" in line with I. Stravinsky ballet music similar in name, will be disappointed: it is a cycle of completely non-ballet chamber sound compositions. But the game element and the logic of the corresponding card games become in fact the main organizing factors in each of the plays. For example, in "Night Preference", the compact arrangement of four instrumentalists, provided by the author in the diagram at the beginning of the score, still awakens imaginary parallels with the seating of preference players around the table. Still, the reference series does not end there. The attentive listener builds intertextual figures between the nature of music, its development, texture, dynamics, etc. and one of the combinations of cards in a game of poker, or solitaire cards, or "nine" games in preference. This listener can find out whether the expression of music corresponds to the severity of emotional states that accompany the players of these card games. But it is especially interesting that constructed in aleatoric and sonorous discourse, the sound-tone complexes of the corresponding colors are not only based on invariable structural elements (say, the symbol of the clubs suit is the consonance e-a-c¹-es¹-f¹-a¹-c²-f² in combination with descending second course of parallel thirds on its background, and the symbol of hearts is a descending lyrical course on the sixth – necessarily cantabile! – with its subsequent melodic singing). They are also visualized iconographically: in those places of the score where the corresponding complexes are fixed, symbols of the corresponding colors are put over their musical record.

We can also take as an example one of the most prominent works of rock music of the twentieth century. It is well-known to most engaged consumers of music and well-known for deeply rooted in the socio-cultural realities of the last third of the twentieth century content and unique and relevant sound. This is Pink Floyd rock progressive album "Dark Side of the Moon" (1973). We will not analyze the album as an artistic phenomenon or a complete piece of music. Instead, let pay attention to the individual tracks that have become decisive for the semantic concept of the album. Let pay attention first of all to the so-called cacophony of clocks from the track No 4 "Time", recorded in a quadrophone system by a recording engineer (later also a successful rock composer) Alan Parsons. The recording of real sounds of different types of clockworks was very meticulous and became one of the most important markers of the meanings of the voiced text of Roger Waters. It is hard not to pay attention to this mixture of real sounds of very specific clocks, which begins the track. But the whole secret is that in the song that this bacchanalia of clock sounds begins, neither the clock nor their sound is mentioned! This is just a metaphor! The main idea of the song is a philosophical reflection on wasting most of the time allotted to man for earthly life on trivial things. And the impossibility to change something after the moment of realizing that life is lived in vain. The time is spent on trivial things and it cannot be returned.

Track No 6 called "Money" and begins with the imitation of the sound of ringing cash in cash registers as a symbol of money. This sound is given in "pure" form during the duration of two bass guitar riff performances. This is followed by this expressive rhythmic riff, which emphasizes more and more the symbolic division of real cash, which is a substitute symbol of the collective concept of "money". Here we come across a very eloquent example of the usage of the resources of the precedent name in the musical text (the lyrics later became part of the famous rock opera by "The Wall"). The name of the composition serves at the same time as the initial token of each of its verses (1. Money, get away... Money, it is a gas... 2. Money, get

back... Money, it is a hit... 3. Money, it is e crime...), from the verbal part the text of which we understand that it is not just about the sound image of metal money in the cash register announced in the sound epigraph and musical accompaniment. This is a collective phenomenon that has become one of the most famous precedent names in the modern world. The ambiguity of this name is eliminated in the third or fourth lines of the final verse.

We actualize the meaning of the precedent name, which is well known to the majority of the population of the modern world and the importance of which the authors of the song wanted to emphasize: Money, so they say // Is the root of all evil today... Money can "get away", or to "return", to be a "dizzying gas", or a "peak of success", or a symbol of "crime", but the main meaning of the name – "as they say about themselves" – is that they are "the reason of all world evil". After listening to the song, no listener will claim that it is a metal cash, which must be grabbed to buy everything that belongs to the highest material values of today world... The most effective effect of this composition on the listener is due to one feature - opposition of two semantically different characters. First of all, this is a non-musical marker: a sound imitation of the cash register with coin splitting as a kind of sound symbol of cash. And, secondly, verbal and musical comments on the characteristics of money, which ends each verse.

Each time they fit into two continuous constructions-phrases that metrically fit into a rare seven-quarter size (7/4 + 7/4) and therefore simply cannot help but focus on the listener, as if sucked into the measured "square" rhythm of producing new and new money. In this case, verbal speech acts are subject to logic. The actualization of the precedent name "money" seems to be bifurcated. It is made by the means of musical speech on the external seductive sound image of non-musical nature in the verbal introductory inserts-imitations of the "ringing coin" from the cash register. Moreover, it is about the musical-verbal comment that money is "the reason of all world evil". Track Us 7 of the album "We and They" was written (called The Violent Sequence) to accompany the scene of the police dispersal of students in the iconic film of the early 1970s "Zabriskie Point", but this melody was rejected by the director Michelangelo Antonioni, as "too sad", and did not enter the film music. Today, few people know these non-musical facts from the biography of Pink Floyd film music. And the film by M. Antonioni was not very successful with the general public. But the ideas and contents of the film, embodied in this desperate, ingeniously instrumental melody, truly lead us to the problem of stratification of society, misunderstanding of people and the impossibility of achieving understanding in modern society. The main markers of the meanings are the absolutely non-musical nature of the opposition: we and they, dark and blue, etc. All this is perceived really very sadly: the far-sighted Antonioni was right.

Immediately after the tragic "We and They" comes an instrumental composition called "Any Color You Like" – track No 8, the title of which is the opening phrase of the legendary advertising slogan of cars "Ford" of the 1920s: "Any color you like, so long as it is black". But the text-precedent was not a holistic advertising slogan (at the time of writing the album, this phrase, which dates from the time of the "Great Depression" remembered only marketers and very old people), but his initial colloquial phrase, which musicians often heard as a rather delicate refusal to do anything from Chris Adams – their road manager. But the track is purely instrumental. That is, the listener builds the desired semantic meanings and allusions depending on their cultural competence, musical experience and the degree of expressiveness of the process of perception and as one of the consequences of the perception of the previous song. The only factor that helps to form the appropriate impressions and meanings is the actual phrase, which we read in the epithet position as the title of the work. However, this marker is not required, as the title of the track is not heard during the hearing. And here from the depths of memory emerges a semi-magical word for fans of rock music: an envelope.

The envelope, which was originally an analogue of a box for wax rolls and serves to protect the “black” disks from mechanical damage, has acquired new values and new functions over time. It became an element of marketing and the main agent of interpretations recorded on the disc! The envelope became the visual “face” of the sound program placed on the media. The envelope contained the contents of the album and lists the titles of the tracks. Moreover, additional letters with accompanying texts were sometimes enclosed in the envelope. Those letters explained the content of the recorded musical works or provided the verbal text of the vocal-instrumental compositions recorded on the disc. In the CD format, envelopes have become mostly plastic boxes (there is also a minimum required cardboard standard, which is usually used to use CDs for advertising purposes). The paper covers were put to these boxes for the imitation of the parties of paper envelopes of “vinyl” plates. And in more prestigious editions all boxes are completed also with small books with accompanying texts-comments. All these are non-musical factors in the formation of the contents of a musical work. We use them as paramusical or extramusical markers to build ideas about the content, concept and form of the whole, very often without realizing it. Now back to the album title. It operates in two versions: “Dark Side of the Moon” and “The Dark Side of the Moon”. Originally, the album was planned to be called just that with the article “the”. But for some reason (in 1971 the album with this name was released by the blues-rock band “Medicine Head”), the working title of the album became “Eclipse” – later this name was given to the final composition of the album. But after Medicine Head failed miserably, the original title of Pink Floyd was restored.

The first few editions started the title of the album with an article. But suddenly it disappears and today the official name is “Dark Side of the Moon”. The reason is quite trivial. The authors decided not to try their luck and not to risk promoting a work on the market with a name identical to the name of the failed project of their colleagues. Moreover, the name had deep associative roots in the field of subconscious expressions of the occult. In fact, many fans of Pink Floyd music can't match the name of the album with the chosen “face” of the envelope, which fixes the decomposition of the light beam into colors (the process of choosing and approving the envelope layout lasted no more than three seconds: creative intuition did not disappoint musicians!). And vice versa. The style of the band compositions of the early 1970s is very monolithic, the sound is quite homogeneous. But after reading (hearing) the title of the album or seeing its envelope, the listener unmistakably identifies the music and its content. We have to admit that both the title phrase and the title image are not actually tied to the musical content. In any case, their original autonomous content is not read at all. They are inextricably fused with music as an integral contextual element of non-musical nature.

4 Conclusion

All our considerations prove the effectiveness of extramusical factors (both paramusical, included in the system of musical language, and purely non-musical, interiorized mainly in different composition in each new act of performance) as dominant, typologically diverse and often aesthetically justified means in organizing art integrity. Their characteristic feature in the music of the late twentieth century is a steady reduction of the role of the individual thesaurus against the growing weight of the “archive of the era”, “intonation stock” and precedent phenomena. This leads to a quantitative multiplication of variants of the perceived work and this number increasingly becomes directly proportional to the level of cultural competence of the listener.

Non-musical markers can be expressive elements of intermediate works, precedent phenomena of various types (especially texts, names and situations) and gestures of physical and energetic nature, paramusical signs. The most important feature that unites them is the ability to “dive” into the flow of musical speech due to its associative potential. In this aspect, non-musical markers

have now become no less important and effective elements in musical works than musical language signs.

Literature:

1. Barthes, R. *The Death of the Author*. Progress, Moscow, Russian Federation, 1989, 325 p.
2. Cox, A. *Music and Embodied Cognition. Listening, Moving, Feeling, and Thinking*. Indiana University Press, Bloomington, United States, 2016, 296 p.
3. Dahlhaus, C. *Was ist musikalische Gattung?* Neue Zeitschrift für Musik, 10, 1974, pp. 620-625.
4. Garmel, O. *Labyrinths “Houseplant”*, Collection of articles: Scientific Bulletin of the National Music Academy of Ukraine named after Tchaikovsky, P.I., vol. 27, 2003, pp. 208-216;
5. Garmel, O. *Some aspects of extra-stylistic interactions of musical texts in modern composition*. Scientific Bulletin of the National Music Academy of Ukraine named after P.I. Tchaikovsky, 38, 2004, pp. 53-60.
6. Hatten, R.S. *Interpreting Musical Gestures, Topics, and Tropes: Mozart, Beethoven, Schubert (Musical Meaning and Interpretation)*. Indiana University Press, Bloomington, United States, 2004, 376 p.
7. Imberty, M. *La Musique creuse Le Temps. De Wagner À Boulez: Musiquepsychologie, Psychanalyse*. L'Harmattan, Paris, France, 2005, 496 p.
8. Ivanchenko, V.G. *Ukrainian Symphony of the Twentieth Century: Factors and Carriers of Content*. National Music Academy of Ukraine named after P.I. Tchaikovsky, Kyiv, Ukraine, 2004, 276 p.
9. Kholopov, Yu. *Changing and unchanging in the evolution of musical thinking*. In: Problems of Traditions and Innovations in Modern Music. Soviet composer, Moscow, Russian Federation, 1982, 230 p.
10. Kokhanik, I. *Word as a factor of style formation in music of V. Silvestrov*. Scientific Bulletin of the National Music Academy of Ukraine named after P.I. Tchaikovsky, 27, 2003, pp. 189-198.
11. Kokhanyk, I. *Intertextuality and the problem of stylistic unity of a musical text*. Collection of articles, 7, 2001, pp. 90-95.
12. Kolshansky, G.V. *Paralinguistics*. Lenand, Moscow, Russian Federation, 2014, 100 p.
13. Kovalinas, M. *The eidosphere of the musical text*. Collection of articles, 7, 2001, pp. 96-105.
14. Kovalinas, M. *Other in the musical text, or an attempt to analyze the intuitive thinking of the composer*. Scientific Bulletin of the National Music Academy of Ukraine named after P.I. Tchaikovsky, 20, 2002, pp. 148-159.
15. Kovalinas, M. *Bach + Schumann + Shostakovich = Wagner? or paradoxes of individual style*. Scientific Bulletin of the National Music Academy of Ukraine named after P.I. Tchaikovsky, 38, 2004, pp. 60-67.
16. Kozarenko, O. *Creativity of M. Skoryk in the context of postmodernism*. Scientific Bulletin of the National Music Academy of Ukraine named after P.I. Tchaikovsky, 10, 2000a, pp. 23-30.
17. Kozarenko, O. *Postmodernist accent in the musical language of Valentin Silvestrov*. Syntagmaton, 15, 2000b, pp. 80-86.
18. Mikhailov, M. *Style Analogies*. Music, St. Petersburg, Russian Federation, 1990, 264 p.
19. Moreva, E.A. *Principle of discourse analysis in musical production*. Scientific Notes of a Cultural Seminar, 2, 2002, pp. 116-122.
20. Moskalenko, V. *About peace of mind*. Scientific Bulletin of the National Music Academy of Ukraine named after P.I. Tchaikovsky, 20, 2002a, pp. 3-13.
21. Moskalenko, V. *About the idea and musical idea for the creation*. Scientific Bulletin of the National Music Academy of Ukraine named after P.I. Tchaikovsky, 21, 2002b, pp. 10-17.
22. Pyaskovskiy, I. *To the problem of semiotic analysis of musical text*. Collection of Articles, 7, 2001, pp. 37-41.
23. Rozhnovsky, V. *Postmodernism: a swan song or a prologue to the neurocosmic era?* Musical Academy, 3, 2001, pp. 17-23.
24. Samoylenko, A. *Playful intentions of a musical text: to the problem of neoclassicist dialogue*. Scientific Bulletin of the

National Music Academy of Ukraine named after P.I. Tchaikovsky, 20, 2002, pp. 51-60.

25. Stashevsky, A. *Volodymyr Runchak – “Music about life ...”*: Analytical and accordion creativity. Volyn regional printing house, Lutsk, Ukraine, 2004, pp. 199 p.

26. Syuta, B.O. *Fundamentals of paramusic knowledge*. Publishing House of Dmytro Burago, Kiev, Ukraine, 2010, 176 p.

27. Syuta, B.O. *Some features of non-musical factors of organization of artistic integrity in modern music*. Journal of the National Music Academy of Ukraine named after P.I. Tchaikovsky, 1(10), 2011, pp. 17-30.

28. Yudkin-Ripun, I. *Semantics and statistics: the organization of the text in the culture of the twentieth century*. Collection of Scientific Works, 2, 2002, pp. 86-91.

Primary Paper Section: A

Secondary Paper Section: AL

PUBLIC OPINION ON UNIFIED TV CONTENT RATING SYSTEM

^aANDREJ BRNÍK, ^bGRACOVÁ SLÁVA, ^cGRACA MARTIN

University off st. Cyril and Methodius in Trnava, Nám. J. Herdu
2, 917 01 Trnava
email: ^aandrej.brnik@ucm.sk, ^bslava.gracova@ucm.sk,
^cmartin.graca@ucm.sk

This study was elaborated within the research project supported by the Grant Agency of the Ministry of Education of the Slovak Republic (KEGA) No. 010UCM-4/2018 titled "Material and didactic support of the teaching of media education through the media training center at FMC UCM".

Abstract: Even though program rating was primarily a matter of broadcaster's choice which depended solely on their own will to tag or not to tag the programs, nowadays there exists a unified content rating system in most of European countries. Mostly, it works based on country specific ratings of self-regulation that differ from country to country. Slovak Republic is one of the first Central European countries who introduced their own content rating system applicable nationwide at the beginning of third millennium. The article deals with Slovak viewers' point of view concerning the topic in three different time frames. It gathers public opinion expressed throughout the last 18 years.

Keywords: Children. Pictogram. Programs. Content Rating System. TV.

Introduction

In spite of development of new technologies and the Internet, TV remains a "favorite" friend of many children. The opinion that they spend little time watching TV would be considered mistaken. Children spend a great deal of their free time watching TV. This may have significant impact on how they absorb knowledge on cognitive, ethical and emotional level. The fact was acknowledged long time ago and society took various actions to protect childish against potentially maleficent media contents. The article deals with Slovak content rating system which is in place couple of years now and its main aim is to protect childish viewers both from legislative perspective and based on knowledge of public.

1 What is "unified content rating system", referred to as TV CRS?

Unified content rating system of programs was introduced in Slovakia back in 2001. Not only television channels but their viewers, too, had to get used to a wide system of TV content rating signs. The flagship of the system is well known by older viewers as long ago, Slovak public broadcaster started to use "a star" while broadcasting programs which were not suitable for infantile viewers (under the age of 18). Next steps in regulation were taken no sooner than in 1997 when private broadcaster TV Markíza started to notify viewers by means of short call signs which introduced programs inappropriate for infantile viewers ahead of them. Another private broadcaster VTV (Vaša TV broadcasted in between 1995 and 2000) introduced their own system, a system of square signs of different colors, by means of which they tagged age groups whom the program content was not appropriate for. Slovak public broadcaster started to rate their programs in 1999 based on their agreement with supervising bodies. A unified system of content rating which might have been used by all TV channels was still missing, though. Professionals specialized in the field started to create a concept of unified rating system under supervision of *The Council for Broadcasting and Retransmission* before 2000. The Council wanted to create rules for pictograms usage. Later on, usage of pictograms became mandatory for all TV broadcasters. [1]

1.1 Legal boundaries of unified TV content rating

Unified system of TV content regulation is set according to Act of Law No. 308/2000 on broadcasting and retransmission. The fifth part of the law stipulates that conditions and exceptions of tagging are in scope of *The Council for Broadcasting and Retransmission*. The law prohibits broadcasters from such broadcasting that could infringe psychological or moral development of minors. Possibly menacing programs should not

be broadcasted from 6:00 a.m. to 8:00 p.m., or even 10:00 p.m.. The broadcaster must inform of age impropriety of programs for youngsters under 7, 12, 15 or 18 years old.

Convention on the Rights of the Child introduced by General Assembly of the United Nations back in 1989 stipulates in the article 18: „States Parties shall use their best efforts to ensure recognition of the principle that both parents have common responsibilities for the upbringing and development of the child. Parents or, as the case may be, legal guardians, have the primary responsibility for the upbringing and development of the child. ...For the purpose of guaranteeing and promoting the rights set forth in the present Convention, States Parties shall render appropriate assistance to parents and legal guardians in the performance of their child-rearing responsibilities...” [2]

The Council for Broadcasting and Retransmission acknowledge this article while creating the content tagging system of programs. CRS methodology indicates appropriateness of broadcasted TV programs for certain age groups based on graphic indicators which flash in the screen corner during the broadcasting. This concerns primarily programs meant for childish viewers (green symbols) and red symbols should appear once a program is inappropriate for certain age group. TV channels use an indicator for programs appropriate for viewers from 15 years of age as the leveling for viewers to 12 years and from 18 years old was insufficient. Real cases have shown that even though the rating system is legally bounding, the scaling of symbols is solely subjective and varies from TV channel to TV channel. TV programs are rated (scaled) by TV channels themselves.

Web portal mediálne.sk claims that even if unified TV CRS tries to define which programs are unambiguously appropriate for childish viewers, at the end, it all depend on parent's subjective point of view and set family values. According to methodology at *The Council for Broadcasting and Retransmission* web site, no program of dark or obscure colors should be broadcasted to children under 7 years old. The same applies for programs which are too loud or include unforeseen sound-related changes. This, for example, is that much explicit that all fairy tales should be excluded from broadcasting for children younger than 7 years old as the part where negative characters appear usually is depicted in dark and obscure colors. In case of programs appropriate for children up to 12 years old, the limit is set in reference to nudity imagery. The formulation referring to nudity expressed otherwise than of common situations in public or family life, especially nudity which is presented in provocative way leading to interest in sexual relationships that may possibly invoke premature sexual instincts of minors can be interpreted in multiple ways according to individual set of rules within the family and it enables certain maneuvering space for its interpretation in terms of what is "common" and what is not. [3]

Conditions of controlled access are realized by means of:

- Setting a program structure in day time from 6:00 a.m. to 10:00 p.m. so that so-called *safe space* is granted (§ 20, art.4).
- Respecting so-called "*drop-scene*" - a time frame closing the safe space. According to Act of Law No. 308/2000 § 20 art. 3, it is a time set to 8:00 p.m. (for viewers under 15) or 10:00 p.m. (for viewers under 18).
- Scheduling programs classified as inappropriate or inaccessible for minors after 10:00 p.m. (§ 20 art. 3).
- Classifying programs by means of pictograms. Program tagging is a result of this classification based on presence of menacing and inappropriate elements and subsequent categorization of programs based on their age appropriateness. (§ 20, art. 5)

Broadcasters have to take into account following factors addressed in the ordinance of the Ministry of Culture of the Slovak Republic on Unified TV CRS:

- a) depiction of parent-child relationship menace or menace in terms of family relationships;
- b) physical, psychic or verbal violence;
- c) sexual relations and scenes;
- d) nudity in sexual context;
- e) verbal aggression, expressiveness in speech, vulgar language, vulgar gestures;
- f) animal abuse;
- g) drug addiction, gambling or other addictions, consumption of alcohol and cigarettes smoking;
- h) presence of imagery or displays invoking fear;
- i) depression, helplessness in terms of perception and cognition of signs possibly leading to inadequate interpretation of media messages or possible imitation of such a behavior, especially among children from 0 to 7 or from 0 to 12 years old;
- j) depiction of unnatural, sudden or unexpected changes of living creatures or depiction of paranormal or other extra-sensational happenings.

Based on level of individual factors occurrence within a media message a pictogram of a bear and numbers 18, 15, 12, 7, or none, are attributed to the program. [4]

1.2 Actual broadcasting challenged changes in Unified TV CRS

The first change comprised of classification scale enlarged by programs inappropriate for minors younger than 15 years old. This happened without prior approval of *The Council for Broadcasting and Retransmission*. This change was introduced by TV channels themselves. The Council not only accepted but also highly approved of it, though, the change was not legally bounding at the time. Neither the law nor the ordinance counted on it. If the set of rules were to be interpreted strictly, the programs tagged by this very pictogram could have been penalized and considered to violate the Unified TV CRS. The broadcasters have initiated one more change in regards to the topic- new visual of the pictograms. Until 2005, a frown face smiley was attributed to the number sign. Then, TV Markíza came with a different suggestion. The new norm used nowadays stipulates a new pictogram consisting of a number in circle and childish viewers programs are tagged by a bear sign, now. Ahead of new visual symbols to be accepted, TV Joj had already started using them on screen. This was another violation of set of rules applicable at the time, though, the TV got out of it all with no fee. [5]

The second change was bigger and more complex. The system of tagging was introduced by the Ministry of Culture of the Slovak Republic in 2008. They have introduced a new ordinance stipulating all details of unified system of audio-visual art works, audio recordings of works of art, multimedia pieces of art and other TV programs or TV program service tagging and the way it was used. It was for the first time that such a thing was dealt with by a ministry and not by the council or TV station themselves. This movement did not come neither as a result of any commitment to the European Union. Slovak Republic was faster than Czech Republic in terms of having introduced laws related to the topic. The main aim of the ordinance was to unify not only TV broadcasting but PC games and DVD platforms, too. One of great pros was that previously applicable pictograms have stayed effective, only that new ones were introduced. The biggest negative was that based on lobbying of various broadcasters, broadcasting of programs inappropriate for minors under 15 was allowed also throughout the day, once again. [6]



Picture 1: New pictograms used in Slovak TV channels. Source: Ordinance of Ministry of Culture of the Slovak Republic No.589/2007 Act of Law, on unified CRS.

The License Council (nowadays called *The Council for Broadcasting and Retransmission*) originally forbade contents inappropriate for children under 15 from 6:00 a.m. to 8:00 p.m., though, the ministry cancelled this regulation by their ordinance. Violent acts ending in one's death or serious consequences, animal cruelty, sexual scenes as part of the story, downplayed presentation of addictions or expression of approval of addiction, violence without caution of its possible risks- broadcasting of all of these has been allowed in full day light once again. TV channels immediately seized their opportunity. In February 2020, a month after the ordinance became effective, TV Markíza offered 25 hours and TV Joj 60 hours of programs tagged as inappropriate for children under 15 before it was 8:00 p.m.. RTVS-STV has never broadcasted such a content in day time. TV Joj was satisfied that they are no longer limited to certain time frames. „It enables us to profit from our library in a more effective way,“ claims Tatiana Tóthová, the spokesperson of TV Joj. [5] The department of media research of SRo did a research for the Council concerning public opinion on pictogram “15”. “87% of asked people think that such programs should be broadcasted after 8:00 p.m. and a third of respondents believe such programs should be broadcasted after 10:00 p.m.,” states the final report. A step needed to re-schedule programs inappropriate for minors under 15 back to late evening time frames is that the ordinance has to be changed or the Act of Law must be amended and prior competencies should be returned to the License Council.

The Act of Law was amended again in 2010. The amendment prohibited broadcasting of programs inappropriate for children under age of 15 from 6:00 a.m. to 8:00 p.m. and this time frame was named the first-time circuit. The second time circuit from 8:00 p.m. to 10:00 p.m. was introduced when it is prohibited to broadcast programs inappropriate for children under 18.

The last amendment dates back to 2013 and became valid in 2014. Two changes were introduced. The first one was a slight change in paragraph 1 and the second one was introduced to deal with teasers for TV programs so that these are classified based on their appropriateness as they might refer to a program scheduled for different time circuit (and are not allowed for the current one). [6]

An interesting fact related to Unified TV CRS is that even though the system of pictograms (signs in the corner of the screen) functions since 2008, four of these pictograms will most likely never appear on screen. It is so because no broadcasting of educational character is present in TV schedule. Talking about conditions of the Slovak Republic school system that is connected to children, media education is realised in three basic forms. First, it may be a separate subject, the second form of media education is implementation of media education into Slovak language, Ethics or other subjects. The third way is integration of students into the creation and management of media content – creation of school media. [7] Educational character of a program is a condition for usage of a green sign tagged as 7, 7+, 12+ or 15+. “The basic condition for programs classification as appropriate or inappropriate for individual groups of minors is that they must be tagged by their producers to be used for educational purposes. Such programs are produced by field experts,” states the ordinance. For the purpose of being tagged as appropriate, TV programs should be in fact classified as inappropriate. Even if a program contains some attributes (such as it not being appropriate for children under 7) but it was created for educational purposes only, it is after all

classified as appropriate for minors under the age of 7. Another issue related to these 4 pictograms is that programs must be tagged by them but it is not clearly stated if the pictogram should be present on the screen during the whole program or for a couple of seconds at its beginning. *The Council for Broadcasting and Retransmission* plans to take into account legislator's intention and chooses an analogical way of tagging to the one with a bear and red pictograms. The fifth new pictogram „U“ goes even further. It is stated in the ordinance that “*audio-visual works of art, programs or other elements of TV program structure classified as appropriate for certain age groups of minors can be tagged by the green letter „U“.*” Facultative character of the pictogram caused that it has not yet been used by any TV channel. [5]

2 Research methods

The article deals with TV CRS as a tool to protect children against violent TV contents in Slovakia. It happens quite often in Slovak households that parents do not know what their children watch or that they allow their children to watch even the programs classified as inappropriate for their age group. Current tendency has manifested in increase of violence in media culture, comprising TV. As a result of it, defensive measures against violent media contents must be taken. Children whom have been repeatedly exposed to violent media content could consider violence to be a natural and common part of their lives and world around them and it is less likely that those children would be able to successfully fight against violence in real life. [8] There exist certain legal norms trying to reduce the amount of violence in media contents so that it is less accessible to childish viewers. Undoubtedly, one of them is TV Content Rating System (CRS) functioning in Slovakia since 2001. CRS has undergone several more or less consolidated changes that lead to its current form. There arises a question; does the society know TV CRS and individual pictograms which are used? Does the public acknowledge the need for content rating classification?

To be able to provide responses to these questions, we will profit from three different researches run in different time frames. All three of them are quantitative researches run by means of questioning chosen sample of Slovak population with help of surveyors or via an electronic survey form. Minors and adults were surveyed to find out if they follow CRS, have knowledge what it actually is about or if they profit from built-in systems in their TV sets which enable them to regulate them watching TV. In the last survey, we also wanted to find out if people acknowledge individual pictograms, not only the fact if parents follow CRS guidelines but also if they know what the rounded pictograms in their TV corner mean.

- Two years after having introduced the Unified TV Content Rating System, The Council for Broadcasting and Retransmission (at that time known as the License Council) run a public opinion survey. They wanted to get to know how the society responds to changes in TV programs tagging. The survey was organized by OMV from November 11th to November 17th 2003, 3.362 respondents were questioned.
- In 2014, FMK run a research in regards to actual state and current trends of media literacy of Slovak adult population. The otherwise quantitative research comprised 10 unified CRS related questions. The object of quantitative research was the viewer of TV programs. The actual research sample was chosen to represent Slovak population, too. Given the number of Slovak inhabitants, 1.828 respondents would be sufficient to represent the Slovak population, though, for the purpose to ensure higher accuracy, the number was increased to 2.815 of respondents aged from 16 to 83. The actual research was run by means of PAPI method (Paper and Pencil Interviewing). The research was run from March to June 2014. All gathered answer sheets were statistically processed via SPSS software.
- The last survey on Unified CRS was run in spring 2020. We used survio.com as an online platform for survey execution. The survey link was published via social

networks in various group pages, usually concerned with the topic of parenthood, motherhood, family, etc. The survey was run from March 25th to April 30th 2020. 1.360 respondents from 15 to 65 years old took part in the survey. The same questions were asked as in 2003 and 2014. Three more questions with depicted pictograms were added to verify if people are really familiar with what CRS signs stand for. Survio business account generated systematic summary and result charts for our survey.

Based on this information, we can try to specify a few research questions:

1. Do parents watch media contents on television with their infant children?
2. Do people (parents) notice and follow TV Content Rating System signs, so - called CRS signs located in the corner of TV screen?
3. Are parents familiar with so-called parental lock in TV sets? Do they profit from it?
4. Is society familiar with the meaning of CRS pictograms?

3 Results

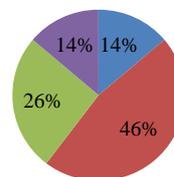
3.1 The first CRS acknowledgement survey (2003)

Up to 78% of asked respondents fully or partially agreed with the idea that tagging makes it easier for parents to choose programs for their children. Slightly less, 64%, agreed that television channels pay more attention to what they broadcast. 20% chose the “*probably not*” option and the option “*certainly not*” was chosen by 10% of the respondents.

The question also turned out in favor of TV content tagging for TV broadcasters who use symbols dealing with appropriateness of TV programs correctly. Overall, 57% of people thought that attributed tags are mostly adequate, 10% find them always appropriate, 17% mostly unreasonable and 2% always inadequate. Only 14% of respondents were unable to comment on the issue. The public did not respond one question clearly and that was whether when choosing television programs for their child or grandchild, they take into account the symbols of appropriateness for given age group. The question did not anyhow concern up to 40% of respondents and 2% could not judge it. 8% always followed the pictogram and 27% of people mostly followed it. On the contrary, they were mostly not noticed by 15% of respondents and 8% of asked people did not notice the sign at all.

If you watch TV with young viewer or viewers, do you follow the pictograms located in the corner of TV screen?

■ always ■ mostly yes ■ mostly not ■ not at all



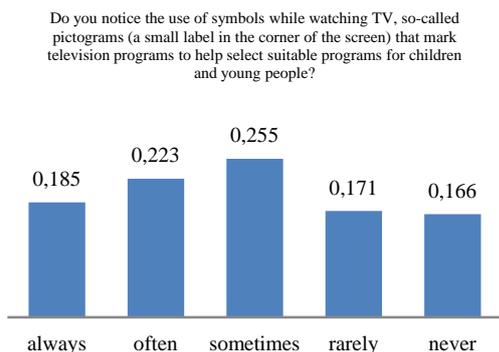
Graph 1: Taking pictograms into account when watching programs with adolescents (2003). Source: Own processing.

One issue was addressed very clearly by the respondents and it was whether it is necessary to tag all audiovisual products on our market with symbols of appropriateness for children and youngsters. Almost half of the respondents - 49% were definitely for it and opted for answer “yes”, 27% opted for “*probably yes*” and 15% considered it “*probably useless*”, 6% “*certainly useless*” and 3% could not take a stand.

3.2 Second CRS acknowledgement survey (2014)

We investigated who do Slovaks watch television with the most frequently. 45,5% of surveyed parents watch television with their children "sometimes, often and very often." 44,2% of all asked respondents did not get involved in watching TV with their children and only 8% of respondents answered that they do not watch television with children at all. Based on the results, it can be stated that almost half of the respondents watch television with their children. This is also valid from the opposite side. Even with younger respondents, up to 65,9% claimed that they watch TV programs with their parents "occasionally, often and very often". We can only assume why these numbers are different. It may also be because of the fact that many young people still live with their parents. According to TNS survey run in early 2013, on a sample of 6.488 respondents "aged up to 20, 95% of young people still live with their parents, which is understandable, because at this age they are still high school students. It is 3/4 up to age 25 and almost 50% of young people live at home by the age of thirty. In the age category of 31-35 years, 1/3 of young people live with their parents." [9] Therefore, we can assume that several respondents of our questionnaire still live with their parents and watch television together. However, parents no longer consider them to be minors in regards to what they watch on TV.

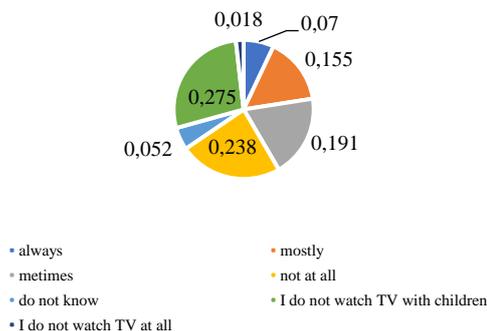
Awareness of television programs tagging by pictograms turned out well. 25,5% respondents notice these symbols in the corner of the screen just "occasionally". 22,3% of respondents "often" notice pictograms and 18,5% "always" notice these. 17,1% of respondents are "rarely" attentive to these symbols and 16,6% never notice them. So we can say that almost 2/3 of the respondents somehow noticed the pictograms.



Graph 2: Awareness of marking television programs with pictograms (2014). Source: Own processing.

Another question dealt with the fact whether parents perceive the pictograms when watching programs with adolescents? As it comes to choosing the level of appropriateness of programs for children, 7% of respondents always follow these symbols. 15,5% of respondents follow them mostly. As it comes to choosing what the children are supposed to watch, the tags sometimes help to 19,1% of respondents. 23,8% of respondents do not follow them at all. 5,2% of people could not answer this question. 27,5% do not watch TV with children and 1,8% of respondents do not watch television at all.

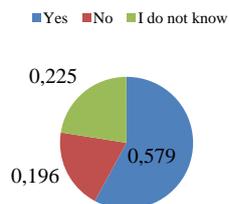
If you are watching TV with a young viewer or viewers, do you follow the pictograms located in the corner of the TV screen when selecting a program?



Graph 3: Taking pictograms into account when watching programs with children (2014). Source: Own processing.

The survey did not only verify whether people follow TV CRS, but also their opinions regarding functionality of this system, as well as how this system helps parents and grandparents to choose the right programs. Up to 57,9% of respondents in 2014 thought that this system helps with programs selection. Only 19,6% thought that it does not help and 22,5% were unable to answer the question.

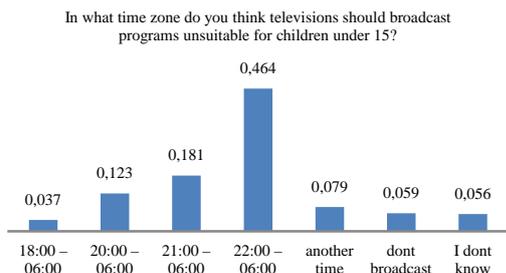
Do you think that marking programs with pictograms dealing with suitability or unsuitability of a broadcasted program for children and young people makes it easier for parents to choose programs for children, grandchildren, etc.?



Graph 4: Opinions on suitability of pictograms as tools for selection of programs suitable for adolescents (2014). Source: Own processing.

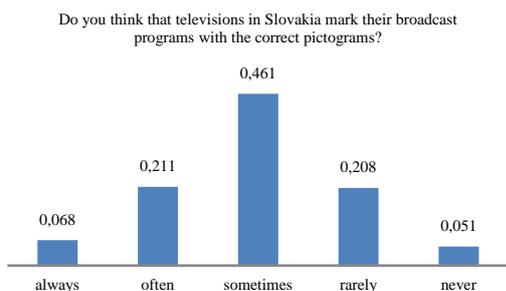
In total, up to 63,6% of respondents were convinced that a unified content rating system should work for other products (such as DVDs, etc), too. Only 12,1% think not, and 24,2% could not express themselves clearly and answered "I do not know".

CRS proclamation defines 2 so-called time circuits. One is for "under 15" broadcasting from 6:00 a.m. to 8:00 p.m. and second time circuit is meant for children "under 18" from 8:00 p.m. to 10:00 p.m. Respondents (46,4%) expressed the opinion that programs inappropriate for children "under 15" should be broadcasted after 10:00 p.m. Only 12,3% of respondents opted for the time zone being used recently. For example, 18,1% think that programs for children "over 15" can be broadcasted only after 9:00 p.m. Only 3,7% answered that such programs could be broadcasted as early as from 6:00 p.m. The public (almost 46,4% of respondents) has thus clearly expressed support for the idea that the first time circuit should be moved from 8:00 p.m. to 10:00 p.m.



Graph 5: Opinion on time zones related to broadcasting of programs unsuitable for children under 15 (2014). Source: Own processing.

The survey also addressed the issue of perceiving broadcasters and their pictogram labelling by the public. Television channels label their programs by themselves and therefore sometimes there may be a situation where the program is marked incorrectly and the broadcaster faces a penalty from the Council. Only 6,8% of respondents thought that television channels "always" label their programs with the right symbol of age appropriateness. The fact that they "often" label them well was thought by 21,1%. However, most respondents, up to 46,1%, were convinced that the television stations label content correctly only "occasionally". The answer "rarely" was chosen by 20,8% of respondents and "never" by 5,1%.



Graph 6: Opinion on correctness of marking broadcast programs with appropriate pictograms (2014). Source: Own processing.

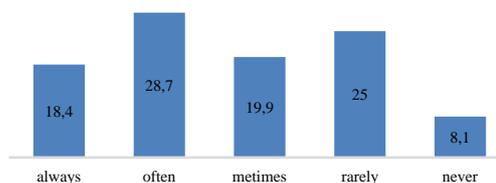
The last area examined was use of so-called parental lock - feature that all TV sets have. It is a function that locks TV and makes it work again after entering the correct password. Almost 78,8% of respondents were familiar with this function and the fact that the television sets are equipped with. Only 21,2% did not know a parental lock existed. Most of respondents, up to 47,4%, answered that minors did not live in their household and therefore they have no reason to use it. In 2014, only 9,1% of respondents, where children lived, used the parental lock. On the other hand, 14,6% of respondents did not use the parental lock functions, even though minors lived in their household. A total of 1,1% of households where children lived could not say whether they use a parental lock or not.

3.3 No. 3 CRS acknowledgement survey (2020)

The rise of various streaming services such as Netflix, HBO Go, Apple TV+ etc., caused a minor revolution in television viewing. Besides the fact that today's households own even more TV sets than in 2014 (not only a TV set but also a laptop, a tablet or even a mobile phone are used today for watching TV). As a result, up to 94,6% of respondents watch TV "always" or "occasionally" alone. As it comes to parents, 8,1% "always" watch TV programs with their children regularly and 40,4% follow the tag "occasionally".

Pictograms are "always" noticed by 18,4% of respondents in TV program and 28,7% of viewers notice the tags "often". 19,9% of respondents notice the tags "sometimes", compared to 33,1% of respondents who "rarely" or "never" notice the signs (tags).

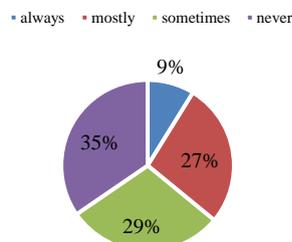
Do you notice the use of symbols while watching TV, so-called pictograms (a small label in the corner of the screen) that mark television programs to help select some suitable programs for children and young people?



Graph 7: Awareness of tagging television programs with pictograms (2020). Source: Own processing.

8,8% of respondents "always" follow these pictograms while watching television programs with the youngsters. 27,2% follow it "mostly", 29,4% "occasionally" and only 1/3 of respondents (34,6%) do not follow the tags at all.

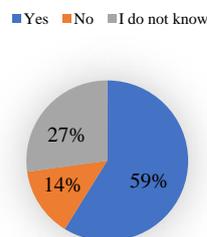
If you watch TV with young viewer or viewers, do you follow the pictograms located in the corner of TV screen when selecting a program?



Graph 8: Taking pictograms into account when monitoring the youth programs (2020). Source: Own processing.

More than 58,8% of respondents think that tagging programs with pictograms in terms of their appropriateness for children and youth makes it easier for parents to choose programs for children, grandchildren, etc. On the contrary, only 14% think that this system does not help them and 27,2% could not take a clear standpoint on the issue.

Do You think that tagging the programs based on their appropriateness for children by means of pictograms does facilitate the parent's their choice?

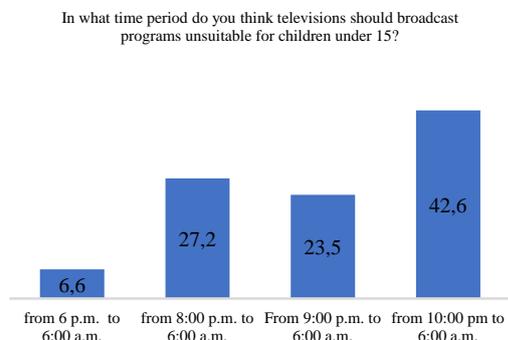


Graf 9: Opinion on appropriateness of pictograms as a tool to choose the right TV program for minors (2020). Surce: Own processing.

Sixty-one per cent of respondents were in favor of tagging all audio-visual products on our market (e.g., video games, etc.), 24,3 % think that it may be necessary and only 9,6 % are convinced that it is not necessary at all.

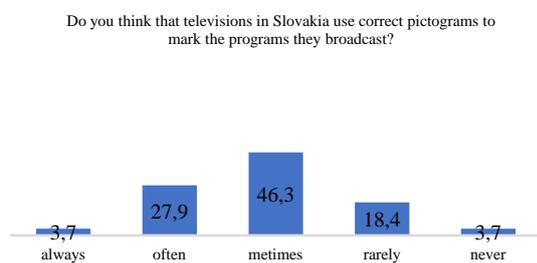
There have also been interesting opinions on the time circuit for children under 15 years of age, which is currently set by

legislation from 6:00 a.m. to 8:00 p.m. However as much as 42,6 % of respondents think that this time circuit should be extended to 10:00 p.m., which coincides with the opinions of people from 2014. Another 23,5 % think that this time circuit for children under 15 should also be extended, but only to 9:00 p.m. In addition, 27,2 % think that the time circuit by 8:00 p.m. is just appropriate and even 6,6 % would cut this time by 6:00 p.m.



Graph 10: Opinion on time periods for broadcasting of programs not suitable for children under 15 (2020). Source: Own Form

Opinions of people on whether televisions mark their programs with appropriate symbols did not favor televisions. As many as 46,3 % of respondents think that televisions tag programs correctly only "occasionally". Only 3,7 % thought that televisions "definitely" tag their programs "correctly" while 27,9 % of respondents thought that they "often" tag them correctly. 3,7 % were convinced that programs are "definitely" tagged "incorrectly" and 18,4 % of respondents thought that programs are only "rarely" tagged "correctly".



Graph 11: Opinion on correctness of marking of broadcast programs with relevant pictograms (2020). Source: Own Form.

Also in 2020, we asked respondents about the use of parental control as a function to prevent watching inappropriate media content offered by televisions. As many as 80 % of respondents knew what the function of parental control was. Only 11,8 % did not know what the function was and 8,1 % said they might know. Only 11 % of households with little children use the function of parental control, compared to 20,6 % of households with little children not using the parental control.

The following are questions which were not included in previous surveys and which were added in 2020 because the aim was to find out whether, in addition to knowing what TV CRS is, parents also understand its meaning. Therefore, we selected 4 pictograms and asked respondents about their meanings. Pictogram 7 was deliberately chosen because it appears as -7, +7, and 7 in the red circle. The question of what the *green pictogram -7* means was answered correctly by 75 % of respondents. Some of them, 19,9 % thought that it was an unsuitable program for juvenile children under 7 years of age and 5,7 % of them thought that it was a program suitable for juvenile children older than 7 years.

However, there was no clarity regarding the *green pictogram 7+*. Only 46,3 % of respondents correctly mentioned that this was an educational program for juvenile children from the age of 7. More than half – 51,5 % – incorrectly thought it was

a program suitable for juvenile children older than 7. Only 2,2 % incorrectly stated that it was a program unsuitable for juvenile children under 7.

As for *red pictogram 7 in the circle*, more than 93,4 % of respondents stated correctly that this was a program unsuitable for juvenile children under 7. As for other respondents – 3,7 % of them mistakenly believed that it was an educational program suitable for juvenile children under 7, and 2,9 % thought that it was a program suitable for juvenile children older than 7 years of age.

The last pictogram examined was that of *green teddy bear*. Up to 76,5 % of respondents mistakenly believed that it designated a program suitable for juvenile children under 7. Only 18,4 % could answer correctly that it was a program suitable for juvenile children under 12; 5,1 % also incorrectly claimed that it was a program suitable for juvenile children under 15 years of age.

4 Discussion

All three surveys show how people's views have changed in the nearly two decades since the introduction of television labeling. While in 2003, 78 % of the population was convinced that pictograms made it easier for parents to choose a program for children, in 2014, the percentage fell to only 57 %. This was similar to the year 2020 when the percentage is 59 %. There has been some decline in the belief that the symbols really help. It can only be assumed that the reason for this is precisely because of a change in habits when watching a television program. Nowadays, many people prefer to watch television programs through other devices. Today, television is watched with parents certainly much less than in the times when there was one or at most two television receivers.

Also answers to question whether people think that televisions label programs correctly differed significantly, with answers in 2003 being considerably different from those in 2014 and 2020. Two years after the introduction of television programs' labeling, up to 67 % of the population thought that televisions "always" or "often" label their television programs correctly. Eleven years later, only 27,9 % of the population thought so, and in 2020, 31,6 % of the population had the same opinion. If one looks at the development of fines which televisions may receive for incorrect labeling, the years 2008 (since the Ministry of Culture's Ordinance) to 2014 were really turbulent. Television channels were still learning how to implement the new ordinance when tabbing programs, which could have been perceived negatively by the parents themselves – television viewers. Later, the fines dropped significantly, which is why in 2020, confidence in labeling by televisions has started to grow again. Correspondingly, in 2003, people thought that only 19 % of programs were always tagged incorrectly, in 2014 this was as high as 25 % and in 2020, it fell slightly again to 22,1 %.

In 2003, up to 35 % of respondents always and often followed the pictograms; in 2014, this trend fell to 22,5 % but in 2020, it rose again to 36,2%. Also this can lead to an improvement in the discipline of program tagging by television broadcasters as they label programs themselves. In addition, considering current opportunities to watch television through any device, it is the parents who at least notice the suitability of a program for children when they no longer watch the whole program with them.

From the point of view of the author, the most sophisticated system for tagging media products, the Dutch NICAM, is the best and most used by countries also because it tags all audiovisual products on the market – not only television programs but also video games or movies etc. Thanks to this system, parents who know the meaning of pictograms are able to distinguish between the suitability and unsuitability of other than just television products. To find out the public opinion, the respondents were asked whether they would be in favor of similar uniform labeling of audiovisual products in Slovakia as well. And the results were clear in each survey. In 2003, 49 % of respondents were "definitely in favor" and 27 % of them were

"maybe in favor". In 2014, 63,6 % of respondents were unequivocally "in favor" and in 2020, the percentage of those in favor of unified tagging system of audiovisual products on the Slovak market rose to 66,1 %.

Other questions were found only in the 2014 and 2020 surveys. These were questions such as whether parents watch television with their children, whether they even notice pictograms while watching it; other questions covered time curtain of programs and parental control in TV receivers. When asked if parents watch televisions with their children the data provided the following answer: a total of 45,5 % of surveyed parents watched television with their children "occasionally, often and very often" in 2014. Six years later, 8,1 % of parents "always" watch TV programs with their children and 40,4 % of them watch TV programs with their children only "occasionally". It can be stated that the parents' habits slightly improved. It is interesting to note that in 2020, as many as 94,6 % of respondents "always" and "sometimes" like to watch television on their own.

In 2014, 40,8 % of respondents "often" and "always" noticed the small symbols about the suitability of the program placed in the corner of the television screen; however, 33,7 % of respondents noticed them only "rarely" or "never". In 2020, the situation has slightly improved. 47,1 % of respondents answered "often" and "always" compared to "rarely" or "never" answered by 33,1 %. There has been a certain slight improvement which may also be due to the fact that the young generation who knew the system has grown up and a new generation is growing up being aware of the fact that televisions use TV CRS.

What is really interesting are the opinions on the time curtain for television content unsuitable for children under 15 years of age. Currently, the time curtain is between 6:00 a.m. to 8:00 p.m. We asked the public what they thought about this time period. The results are always the same in both surveys – in both 2014 and 2020, people were convinced that this time circuit should be shifted to 10:00 p.m. just like the second time curtain for children under 18 (approximately 47 % of respondents in 2014 and almost 43 % of them in 2020 agreed with it). Even though the public has apparently been in favor of shifting the first time circuit for years, as evidenced by surveys, this has not happened. However, there is the public and its views which are in stark contrast with lobbying and advertising business by broadcasters who do not want to lose the target group 15+ in their "prime time" from 8:00 p.m. Even though, it is mentioned that traditional TV and Home Video will remain the most unprofitable media industries, also with Newspapers and Consumer Magazines and also Online Advertising and TV Advertising are seen as separate media industries because of their different production and managerial processes. [10]

What was most shocking for the author was the fact that the public does not use the function of parental control even though they know what this function means. In 2014, as many as 78 % and in 2020, as many as 80 % of respondents knew what a parental control was but, nevertheless, in 2014, only 9,1 % of households used it and in 2020, it was only 11 % of households. It is an effective regulatory tool which can be used mainly by parents to prevent inappropriate programs to be watched by children. Today's more advanced parental controls allow one to set certain time when the TV should be locked and the time it should be unlocked again. It is thus possible to ban children from watching television for example in the evening.

Generally, the research questions regarding the knowledge of TV CRS in Slovakia could be answered as follows:

1. Do parents watch media contents on television with their juvenile children?

It can be stated that almost half of parents watch television with their children.

2. Do people (parents) notice and follow the system for labeling television programs, the so-called TV CRS, which is located in the corner of TV screen?

Nearly half of the people (on average 44 %) notice the pictograms about the suitability or unsuitability of television content for others. On the other hand, the question is whether they really follow them. Both children and parents as well as the elderly expressed their opinions within the examined survey. On average, one third of the population tries to follow these symbols.

3. Are parents familiar with the so-called parental control in their TV receivers?

For many years, television manufacturers have been installing a system for the protection of juvenile children, the so-called parental control, in their facilities. Based on the found out facts it can be stated that the data show that more than three quarters of people are aware of the function of parental control. On the other hand, the public does not use parental control even if they know what its function is.

4. Is society familiar with the meaning of TV CRS pictograms?

The public does not clearly know the meanings of all pictograms from the TV CRS ordinance. Therefore, it would be good to prepare an information campaign by the Council for Broadcasting and Retransmission to increase the awareness of these symbols.

Thanks to the research analysis, some interesting findings were detected such as, for example, those that people would accept labeling with the same symbols also on other audiovisual products such as, for example, cinema films or video games. Based on the analysis of the labeling systems, the NICAM system in the Netherlands has been recognized as the most suitable labeling system. It also refers to other audiovisual works on the media market, such as video games or cinema films. The society should ideally go in this direction and place the same symbols that people know from the TV screen on the packaging of video games and on all materials related to a film before it is shown in cinemas. However, the scope of the Council for Broadcasting and Retransmission would have to be extended to enable it to exercise control and impose sanctions also in media parts other than radio and television. In addition, the ordinance of the Ministry of Culture on TV CRS would need to be extended to these segments of audiovisual products by amending.

Furthermore, based on the analysis of compliance with section 20 of Act. No.308/2000 Coll., it has been found out that the poor labeling of programs with pictograms is one of the most common problems with the compliance with the above mentioned section. The solution of the Dutch system is to have a joint commission whose members are broadcasters as well as NICAM members – experts, who jointly label programs. In our country, current practice is that programs are labeled by broadcasters themselves. Therefore, if we were to assign this competence to the Council for Broadcasting and Retransmission we could avoid unnecessary violations of this section. Much in the same way as was done in the Netherlands, at least one television representative and experts from the Council for Broadcasting and Retransmission would be members of this team in charge of labeling the programs.

In addition, four of the pictograms specified by the ordinance will probably never appear on the screens of commercial stations. This issue has been outlined in the introduction of the publication. Commercial stations do not use such labeling because they do not broadcast any educational programs. A condition for a program to be marked with the green sign -7, 7+, 12+ or 15+ is its educational nature. It is bizarre that in order to be suitable the programs must necessarily be unsuitable. Even if the program contains the criteria of unsuitability "unsuitable for children under 7", but the special condition is met that the program is created exclusively for educational purposes, such a

program is classified as suitable for the age group of juvenile children under 7. The fifth new "U" pictogram has even been worse off. The ordinance states: "Audiovisual works, programs or other components of the television program service classified as suitable for all age groups of juvenile children may be labeled with the letter "U" in green color." "U" has not been unveiled on any television station yet. Therefore, these pictograms could be cancelled. As a result, there will be fewer pictograms and their use will be clearer for parents (as the research has shown, people do not know the meaning of all symbols) for whom only the information on the age under which a TV program, video game or film is not suitable will be sufficient.

There is little doubt about the importance of TV CRS. We believe that the future will also bring its improvement or unification within the entire European Union.

5 Conclusion

Thanks to the results of three different research studies carried out several years apart, it is possible to observe changes in the behavior and views of the Slovak population in relation to the uniform system of labeling television programs. However, the strong influence of the Internet and streaming services is still being forgotten. It is therefore desirable, even necessary, for this agenda to be taken over by the European Parliament and to extend its scope and effectiveness to the whole Europe. The labeling system will be the most effective if television, on-demand services, the Internet, games, and entertainment production will be covered within one legal norm.

Literature:

1. BRNÍK, A.: Ochrana dětského diváka před nevhodným televizním obsahem = Protecting children's audience from inappropriate television content. In: *MMK 2014: mezinárodní Masarykova konference pro doktorandy a mladé vědecké pracovníky : sborník příspěvků z mezinárodní vědecké konference*. Hradec Králové: Magnanimitas, 2014. ISBN 978-80-87952-07-8, S. 2313-2319 [CD-ROM].
2. UNICEF: Dokument o právech dieťaťa. [online] 2015 [2019-01-25]. Available at: <https://www.unicef.sk/dokumenty/materialy-na-stiahnutie/advocacy/dohovor_o_prava_ch_dietata.pdf>.
3. AUGUSTÍN, R.: *Jednotný systém obťažovania*, [online]. In: *Mediálne.sk*, [2019-8-25]. Available at: <<http://medialne.etrend.sk/televizia-clanky/jednotny-system-obtazovania-.html>>.
4. BRNÍK, A.: *Jednotný systém označovania v televíziách na Slovensku*. In: *(Ko)media : (ko)munikácia - (ko)operácia - (ko)ntestácia*. Katowice: Wydawnictwo Naukowe UNIKAT-2, 2014. ISBN 978-83-62314-88-1, S. 83-97.
5. KRASKO, I.: *Nový systém označovania: konflikt s realitou*, [online]. In: *Mediálne.sk*, 2008 [2019-04-25]. Available at: <<http://medialne.etrend.sk/televizia-clanky/novy-system-oznacovania-konflikt-s-realitou.html>>.
6. *Vyhláška MKSR č.589/2007 Z.z. o jednotnom systéme označovania*. [online] 2007 [2020-01-25]. Available at: <<https://www.epi.sk/zz/2007-589>>.
7. VRABEC, N., BŔTOŠOVÁ, L.: The concept of learning-by-doing in the context of media education and school quality assessment. In *Communication Today*, 2020, Vol. 11, No. 1, p. 140-148. ISSN 1338-130X. 142 p.
8. MESÁROŠOVÁ, B., NANIŠTOVÁ, E.: *Násilie v masmediách a jeho vplyv na detského diváka*. In: *Dobrý človek*. (pedagogicko-psychologicko-kultúrny pohľad), 139 p.
9. DANKOVÁ, E.: *Mladí sa od rodičov neponáhľajú, nemajú na vlastné bývanie*. [online] 2015 [2020-2-5]. Available at: <<http://kosice.korzar.sme.sk/c/6939982/mladi-sa-od-rodicov-neponahlaju-nemaju-na-vlastne-byvanie.html>>.
10. RADOŠINSKÁ, J., KVETANOVÁ, Z., VIŠŇOVSKÝ, J.: To thrive means to entertain: the nature of today's media industries. In *Communication Today*, 2020, Vol. 11, No. 1, p. 4-20. ISSN 1338-130X.

Primary Paper Sections: A

Secondary Paper Sections: AJ

WEB ANALYTICS AS A TOOL FOR MONITORING STUDY PROCESS OF HIGH SCHOOL ONLINE COURSE

Michal ČERNÝ

Faculty of Arts, Masaryk university. Arne Nováka 1, Brno, Czech Republic
email: mcerny@phil.muni.cz

The paper was written as part of the TA ČR Éta TL02000040 project: A platform for knowledge transfer: information literacy for high school students in an open mash-up virtual learning environment.

Abstract: The paper analyzes the possibilities of using Google Analytics in the study of students' learning behaviour and for the design of online courses. Specifically, it analyzes data from an information literacy course for high school students. The paper uses data from an online course for high school students between 1 February 2020 and 16 September 2020. There are a total of 785 unique visitors whose behavior on the web was the basis for our analysis. We also use information from 7 semi-structured interviews with teachers and from 2 focus groups with students (14 students) to interpret the data.

Keywords: design course, Google Analytics, information literacy, learning analytics, online course.

1 Introduction

Online courses can take various forms. Probably the most common are courses based on a particular learning management system (LMS) (Moodle, Open edX, Blackboard, Canvas, etc.). These systems have integrated tools that allow monitoring of students' behaviour in these courses and provide an opportunity to use this information to modify educational content or use various interventions (Brouwer et al., 2016; Dimopoulos et al., 2013; Einhardt et al., 2016).

The goal of learning analytics is in general the description, analysis and use of data on learning behaviour. The Society for Learning Analytics Research (SoLAR) defined this process as follows: "Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs." (SoLAR, 2020) Cooper points out: "Analytics is the process of developing actionable insights through problem definition and the application of statistical models and analysis against existing and/or simulated future data." (Cooper, 2012; Siemens, 2003a)

The SoLAR definition is important for our research context because it focuses on the research of the environment and the processes that take place in it. While tools integrated in LMS can be used both to monitor individual models of study behaviour (micro perspective) and to analyse the broader behaviour or readership rate for materials (macro perspective), working with open web courses does not give us both of these options and we can focus only on macro perspective. That is, we can undertake research directed towards the educational environment and the processes involved with a view to achieving innovation.

We agree with Siemens' concept (Long & Siemens, 2011; Siemens, 2013b) which emphasizes that the primary goal of learning analytics is not the research data as such, but the activity that a teacher, lecturer or course designer can perform to get the best results.

What is available for open web courses is consistently only data that can be obtained through web analytics tools (Guan et al., 2020; Chitkara & Mahmood, 2019; Phippen et al., 2004; Kirsh & Joy, 2020). On the one hand, this brings many difficulties and problems, but at the same time we believe that this concept opens up interesting opportunities for further research and exploration.

The aim of this study is to examine, on specific data, how web analytics tools can be used in the study of learning behaviour and what research questions are relevant to these research tools. We would like to abandon the somewhat sceptical discourse on

the applicability of web analytics tools. The focus of our study lies in the methodological part; we applied our methodological tools to real data collected in projects concerned with the use of learning analytics.

The concept of web-based (hypertext) courses has been described in positive terms, for example, in a study by Jiang and Ting (2000), which identified factors affecting students' perception of a web-based course. It showed that the factors impacting the overall evaluation by the students include the comprehensibility of assignments and assessment of the work of the instructor or the way interactions are structured. However, little attention was paid to the overall design.

Understanding how to work with web analytics data is essential for further development of these open online courses and their appropriate optimization, whether in terms of design, structure or other elements used.

In our research, we focused on open web courses that are based on publicly indexed, searchable and usable content and use common content management systems (CMS), such as Wordpress, Umbraco, Drupal, Google Sites or Joomla, for their presentation. Thus, these are websites with structured educational content, which can be further utilized, for example in the form of face-to-face lessons (blended learning) or by establishing links to other systems (for example, tests, assignment submission, etc.). The first popular courses of this kind are associated with connectivists and the CCK08 course, which also used blogs (Fini, 2009; Downes & Siemens, 2008).

1.1 Research background

In our research we drew on several previously published studies that have demonstrated quite clearly how web analytics tools can be used to analyze learning.

Mc Guckin & Crowley (2012) presented in their study their own research tool. The study addressed the general issues of using Google Analytics and the course under examination and then provided a classical data analysis—described how the data were collected, showed selected aspects of evaluation (focusing only on basic metrics and leaving for instance traffic flow tracking aside), which was followed by an interpretation of the data obtained and closed with a discussion.

Moissa et al. (2014) developed the AdaptWeb visualization tool, which combines data from web analytics based on Piwik with data from local databases. The tool provides 20 metrics that a researcher or teacher can use as part of learning analytics. It is vital to set up the whole concept of web analytics in such a way that the data obtained are understandable and usable for the teacher who works with the course - it should provide what is normally provided by an LMS dashboard.

Luo et al. (2015) published a study that paid more attention to the specific methodological approach to the whole issue, rather than to the case study it is based on (using data from a university course). The authors of the paper pointed out that Google Analytics is a very good tool for tracking parameters such as pageviews, bounces, study time, etc. At the same time, however, these parameters do not allow any individualized approach and the demographic possibilities are also relatively limited. Hence, we can observe a certain discrepancy between what web analytics needs to track and what is useful for learning analytics. Romanowski and Konak (2016) examined a university online course in their study. It represents a preliminary study or preliminary research with the following finding: "Findings showed that interactivity of a course page was the most important factor for increasing student engagement with the course content. In particular, in-page quizzes were found to be very effective in improving student engagement with the website."

This preliminary study has shown how Google Analytics could be a valid tool to observe and improve student learning online."

The authors pointed out that Google Analytics can be used to collect enough data to perform learning analytics and gain an understanding of learning behavior. Nevertheless, better results could be achieved if we added other data sources. The problem with Google Analytics in general is that while it describes learning behavior it does not offer many clues for understanding it.

Rohloff et al. (2019) achieved probably the best theoretical grasp of the whole issue of using web analytics for learning analysis. They conveyed the view that Google Analytics can be used for learning analysis, but they also noted the ethical dimension of the whole issue and the topic of comprehensibility and availability of information that Google Analytics offers. The study dealt very carefully with possible issues and inaccuracies in the measurement, which may be useful for analyses of study limitations.

From a certain perspective, we could also include in this overview the study of Ali et al. (2012), who conducted research on click stream (Montgomery et al., 2004, Wang et al., 2013) in educational applications and their interpretation. Although they did not use web courses or classical web analysis tools, their methodological approach is to a large extent applicable in our environment as well.

Clearly, the topic has been addressed by a relatively limited range of studies, to which we can also add our two case studies (Černý, 2018; 2020). Our goal is to continue in this line to some extent, but at the same time to strive for a broader understanding of the whole issue in the light of other research findings.

As Rohloff et al. (2019) emphasized, we cannot reduce the discussion on the use of web analytics in learning analytics only to web-based courses that are based on platforms such as WordPress or Umbraco. At present, web analytics (Google Analytics) is commonly implemented in MOOC platforms such as edX, Coursera and Udacity and is actively used in them, although not at the level of individual courses or students.

2 Methodology

We agree with Luo et al. (2015) that Google Analytics becomes a truly important research tool especially when its use is linked to other data, whether qualitative or quantitative in nature. Current research discourse, outlined in the Research Background section, has focuses mainly on combining Google Analytics data with data from LMS or other technical systems. As online ethnology progresses (Androustopoulos, 2008; Murthy, 2008, Markahm, 2005; Pink 2016; Varis, 2016), we also try in our research to combine quantitative tools with qualitative data that serve to interpret them. Nevertheless, we supplement web analytics data, for example, through interviews, diaries, focus groups or analysis of other documents. In two years of collaboration, it can be said that researchers are well aware of how the research community works and studies.

In our previous studies of other online courses (Černý, 2020), we focused mainly on data from homework, student self-evaluation or test and self-evaluation results. We believe that the ideal approach (which, however, is almost impossible due to the current COVID-19 situation) would be a deep integration of various research methods that would allow us to formulate broader interpretation frameworks and theories—an aspect of web analytics use that is according to Luo et al. (2015) lacking in learning analytics.

2.1 Research sample

Our research was carried out as part of the development of an online information literacy course for high school students in the Czech Republic. The project (developing course) set forth the requirement to provide an open online web course created by the university that will use the Umbraco system (an open source

content management system implemented throughout the university).

Although the topic of information literacy is linked with the existence of many standards and competence frameworks, we decided to apply them relatively loosely and to prefer an approach associated with community-designed curriculum (Cormier, 2020; Ruth et al., 2019). This approach was motivated by several factors. In the Czech state curricular framework, information literacy is not established as a separate element and schools implement it in their educational programs diversely. Since our intention was for the schools to be able to use the course in real teaching, it was necessary to take into consideration their specific possibilities when designing it. Hence we produced a functional prototype of the course, which was implemented at four high schools in the Czech Republic and is the subject of our analysis.

Five high schools (a library school, a secondary technical school, two grammar schools, and a nursing school) with a total of about 500 students were involved in testing the courses. The students used the website in collaboration with their teacher. However, the online course is open to any student who can work with it. The data we have suggest that the vast majority of the sample (85-95%) is formed by high school students. This research sample (schools), same as the selection of teachers, is given by the project assignment, within which we create and test the course. Students for the focus group were also selected from this sample.

In our case study (relevant research questions 1-3) is the subject of research online course (available from: <https://kisk.phil.mu.ni.cz/onlife>), which used students and teachers at the high school.

2.2 Research tool

Google Analytics (2017) is currently by far the most common (although not the only) tool for working with web analytics (Clifton, 2012). According to W3Techs (2020), more than 84% of websites that have implemented web analytics use Google Analytics, which is more than 55% of all websites. Other tools that can be used for this purpose are New Relic, Live Internet, Yandex, Metrica and WordPress Jetpack.

The objective of Google Analytics is to measure and analyze website traffic. It is a free product (for the vast majority of common projects), which can be relatively easily implemented in any website or object that allows embedding HTML code or has a standardized interface or add-on for code embedding. Google uses this tool primarily to support effective management of advertising campaigns, in which a good knowledge of user behaviour (Omidvar et al., 2011; Cutroni, 2010) and their demographics is a basic prerequisite for successful marketing. This is also an area of Google Analytics use that has been the major focus in literature (Tonkin, Whitmore & Cutroni, 2011; Ledford, Teixeira & Tyler, 2011), while the topic of applying data to the field of learning analytics has received less research attention (Chatti, et al., 2012; Baker & Inventado, 2014).

Rohloff et al. (2019) pointed out that their primary interest was website analysis focusing on the customer, not on working with students. It is generally believed that learning behavior is more difficult to analyse through web analytics than, for example, an e-commerce store, because it does not have easily accessible success metrics (paid order in the case of an e-shop, number of clicks before ordering, etc.).

Our research combined quantitative methods based on data from Google Analytics and qualitative methods. Our source of qualitative data was a focus group with students of one of the schools that have been implementing the course we had designed. Due to the epidemiological situation, it was not possible to obtain a greater amount of data. The focus group was based on a model of two meetings in one day—one line of research focused on user testing of the website, the other on the

content of the course. The students were divided into two groups of 7 students. In total, we processed notes from four meetings. We worked with 14 students divided in half within two focus groups.

Subsequently, we proceeded with interviews with teachers who work in these schools (and use this course in teaching). A total of 7 semi-structured interviews lasting between 30 to 50 minutes were conducted. These data allowed us to introduce a broader interpretation framework, as proposed by Romanowski and Konak (2016). These qualitative data create the possibility of understanding data from web analytics, so that we can interpret them in an educational context. Web analytics is primarily focused on marketing or the business sphere in general. Our goal is to move the interpretation framework into the field of education.

2.3 Monitored metrics and research questions

Here we would like to present the research questions that we attempted to answer in our case study. However, as we emphasized in the introduction—the primary goal of this case study was not the analysis of the “case”, but rather looking deeper into the possibilities opened up by web analytics.

For these reasons, we formulated the following research questions:

1. Who are the students and what do we know about them?
2. What technologies do they use during their course study?
3. What educational content do they choose and why?
4. What data on student behaviour can be used for the design of the course and its content?
5. What are the strengths and limitations of using Google Analytics to analyse online learning data?

From the list of research questions, it is clear that we drew on those formulated by Luo et al. (2015). We adjusted the number of questions with regard to our research experience and the specific structure of the data we worked with, but also with a certain focus on how we understand the role of learning analytics—as a tool for studying the learning environment and the processes involved.

The paper is designed as a case study (we work with data on one course, with one group of teachers and students who use the online course). However, it has a broader application impact - similar analyzes can be used in general for any online course in which web analytics tools can be implemented.

The first three questions are based on working with Google Analytics data concerning a specific course. The other two questions focus in general on the reflection of the tool and its possibilities in the field of analysis of the educational environment.

3. Results and discussion

In this section, we present a comprehensive view of the research data in the overall context. In our analysis, we used data from 1 February 2020 to 16 September 2020:

- 785 unique visitors
- 31.5% of visitors returned (more than 1 visit)
- There was an average of 2.11 visits per user
- The number of pages displayed per session was 7.86
- The average time per visit was 10 minutes and 36 seconds
- 96.45% of visits were from the Czech Republic
- 70.83% used desktop
- 26.37% used a mobile phone, 2.8% a tablet
- 59.49% used Windows

The website had the highest number of visitors in the period from 11 March 2020 to 27 March 2020, i.e., in the first 14 days of school closure in the Czech Republic.

These parameters of research data constituted the framework for our further analysis. We deliberately extended the research period until 16 September, because in the new school year (in the Czech Republic from 1 September 2020) the course was not yet promoted among newcomers and students who had started engaging with it more intensely during school closure could return to it, as they had been planning to during the focus group.

3.1 Who are the students and what do we know about them?

As for the language, Czech naturally dominated with about 90%, which corresponds to the fact that the course was written and composed in Czech. 66% of users were women (which roughly corresponds to the composition of our sample) and 33% were men. About two-thirds of users were people aged 18-34. In our experience, however, this metric is not very reliable. Our students are in the category of 15-17 years, which is not explicitly filtered in Google Analytics.

A useful category is formed by interests, which were processed only for 11.85% of users (the data are non-normalized, so they show part of the whole, not only of the analyzed part):

Table 1 Results on interests of students in the course.

GA data	Extrapolation to the entire population	Interest category
4.97 %	41.94%	Media & Entertainment/Book Lovers
4.01 %	33.84%	Media & Entertainment/Music Lovers
3.97 %	33.50%	Food & Dining/Cooking Enthusiasts/30 Minute Chefs
3.75 %	31.65%	Media & Entertainment/Movie Lovers
3.57 %	30.13%	Lifestyles & Hobbies/Art & Theater Aficionados
3.18 %	26.84%	Lifestyles & Hobbies/Green Living Enthusiasts
2.79 %	23.54%	Shoppers/Value Shoppers
2.53 %	21.35%	Shoppers/Shopaholics
2.40 %	20.25%	Technology/Technophiles
2.31 %	19.49%	Travel/Travel Buffs

As for our knowledge of the target group, we could expect, with regard to the students' fields of study, that literature (students of library studies, grammar school students), health care (high school for nurses) and art (artistic grammar school) would appear in the list. As is evident from the table, the category of literature is represented in the ranking and the other items correspond to what we could label as the lifestyle of young people. It seems that targeting the topic of books and music could be practical from the point of view of working with content, because it is an item that approximately every third student in the course is interested in. If we chose the time spent on a page (which could also correspond to the study interest) as a metric, then books would become an even more important segment (6.06% of 23.38%). These findings can be truly valuable for choosing examples, illustrations or even the tone of voice used in the course.

The data provided by the teachers in the interviews suggest that the students form a highly heterogeneous group of users—there are students of elite grammar schools with very good results in graduation exams, vocational students of a high school for library studies, but also students preparing to become medical nurses with a focus of their work on practical competencies. This heterogeneity was also confirmed by the data obtained from Google Analytics.

The students view themselves as typical representatives of generation Z—they use modern technologies, almost all of them are present on social media (Facebook, Instagram) and consume their content. In general, they are aware that they need to be media literate because they perceive the threat posed by

technology and the danger of being easily manipulated. Their relationship to mobile devices, but also to digital technologies as such, is positive.

The students studied the course online almost entirely during the period when schools were closed. What we consider to be an interesting finding is the fact that the study took place significantly less in the morning than in the afternoon, so students did not respect the normal school schedule, which in the Czech Republic starts at 8 am and usually ends no later than 4 pm. We consider the shift of study time to the afternoon (at least by an hour or two) and its extension to the weekend (especially to Sunday) to be one of the most intriguing findings—students during the pandemic, when they could choose their own schedule, chose a substantially different structure than the one prescribed by common formal education. Interestingly, students also quite often chose the times as late as 10 pm and, on the other hand, did not seem to prefer the “best study time” according to the school curriculum, i.e., between 7 and 9 am.

3.2 What technologies do they use during their course study?

Although the share of mobile devices in web traffic is reported to be generally high (for example, according to Statcounter it reaches about 51%) and we could expect this ratio to be accentuated by the targeting of our course on Generation Z, it seems that the share of both mobile traffic and the use of tablets (with a global share of about 3%) in the course was low. In the observed period, a desktop was used for 71% of the connections and a mobile phone only for 26%. The share of tablets was about 3%, which, due to the relatively small sample, indicates the level of statistical error.

Mobile sessions are generally both shorter (time on page 5:07 versus 11:34) and less deep (5.59 page per visit to 8.21 on desktop). These data led us to two essential considerations of how the course works:

1) A web course - even with a responsive design - is not suitable for the use of mobile devices. Obviously, mobile devices are not students' first choice; they consume study content on the desktop rather than on a mobile phone. The nature of the visit is so different for each option that it seems inappropriate to expect a mobile interaction from students. At the same time, this conclusion is identical with the findings of our previous research indicating that students use mobile phone in the course to obtain specific information (term, link) and not for systematic educational content.

2) If we wanted students to use the course on mobile devices, we would most likely have to provide a specialized mobile application, which would require more demanding and costly development as well as more rigorous content consistency standards.

The focus group showed that students actually use the desktop as a significantly preferred environment for studying not only in this course, but in general. The second interesting finding that helps us understand how students interact with the course is that they did not perceive desktop study as something unpleasant or serious. The requirement for a mobile application was not formulated at all during our research.

With respect to web browsers, our results in fact replicate the well-known statistics - 57% of users used Chrome, 13% Safari, 8% Firefox and 5% Edge. Because Edge uses the same rendering engine as Chrome, this information leads to a system optimization request for Chrome and Safari. All other browsers were completely marginal.

Of the total number of users, 57% used Windows, 20% Android and 14% iOS. These data have significant implications concerning working with applications—given the information available, it cannot be assumed that all users have access to Windows and it is necessary to focus either on applications with support for mobile devices or on online tools. Java applications

seem to be also excluded because Java support was identified by 9% of users.

Desktop users most often used resolution of 1920x1080 (22.35%), 1366x768 (20.99%) and 1534x864 (16.38%). This finding is rather inconvenient from the point of view of the course design, because it shows that it is not possible to count on any unified screen size or resolution. All users (99.46%) worked with 24-bit colour depth.

3.3 What educational content do students choose and why?

While the previous two questions concerned the description of the target group, in this section we focus on the educational content, which is the very core of the educational course. In terms of information architecture, individual course sub-topics are structured into modules. Each module has 6–11 topics. Both modules pages and topics pages can be tracked via Google Analytics separately. At the same time, the system makes it possible, thanks to a suitable architecture, to monitor entire categories of content relatively easily.

In terms of traffic, the following categories had the most views during the period under review:

Table 2 Results concerning module characteristics.

Module	Pageviews	Average time on page [min:sec]
Stage of working with information	1,468	3:15
Working with information and learning	1,302	2:43
Media and citizenship	302	2:45
Working with documents	187	2:31
Security and fairness	205	2:37

The pageviews statistics can be partially misleading because the modules are of different size. Nevertheless, it is clear that the first two topics had by far the most views. This is due to the fact that these modules were explicitly designated by teachers as compulsory for students in most schools. In the other modules, pageviews were to a larger degree driven by selective choice of an individual topic or the students' own interest.

From the point of view of the course design, it is important to note that these were the items displayed at the top (the design always displayed pairs of images with the given topic), which also had an effect on the visits. As data within each category show, sorting and the number of clicks are relatively closely related. This can be illustrated by the first module which provided the largest amount of data.

Table 3 Results concerning characteristics of topics from the “Stage of working with information” module. The last column indicates newly added topics that cannot be consistently compared with the other topics in terms of data.

Topic	Pageviews	Average time on page	New
Searching on the Internet I	351	2:31	
Searching on the Internet II: Where to Search?	160	3:08	
Searching on the Internet III: How to Search?	139	5:23	
Where to look for books?	26	2:53	*
Where to look for specialized resources?	17	1:13	*

Filtering results	130	4:33	
Information evaluation	76	2:52	
Information evaluation: Disinformation and manipulation of information	139	5:23	
Information evaluation: Wikipedia	109	3:30	
Use of information	50	1:31	
Using information to solve problems	115	3:01	

The data show quite clearly that students choose to some extent preferentially—for example, the topic “Information evaluation: Wikipedia” was attractive to them in terms of title, “Information evaluation: Disinformation and manipulation of information” and “Searching on the Internet III: How to search?” in terms of content. Two modules marked as new were added later based on the teachers’ wishes.

In terms of feedback, the topic “Searching on the Internet III: How to search?”, which was positively commented on by both students and teachers in our research, can be mentioned. Another topic appreciated by students was “Information evaluation: Disinformation and manipulation of information” (also being of a reasonable length), which seems to indicate that the time spent on the site is a relatively useful guide for the analysis of interest. Our data suggest that students prefer descriptive titles (as reflected also in the interviews) and these descriptive titles are also more understandable for teachers. This is clearly evident in the information evaluation triad in the table: Topics presented from a general perspective have only a very small number of clickthroughs, but also a low time on page. Students are interested in practical content dealing with topics about which they have some knowledge but are not as strong in them as they would need to be. Both topics with highest time on page fall into this category. In spite of what has been said, it turns out that in our course it is the teacher—who defines for the students what to study and further works with them—that plays a decisive role. However, this does not mean that the preferences of students are not reflected in particular study patterns, which can be seen, for example, in the time spent on page.

3.4 What data on student behaviour can be used for the design of the course and its content?

We have already described some of the options for answering the fourth research question above—we discussed metrics concerned with the number of clicks and time spent on the site, which is a tool we have already used in our previous studies (Černý, 2020). We find this basic analysis crucial when we need to look for answers to the question of what types of content are of interest to students and which are not.

Technical parameters, which can relate both to the tools used in a particular course, and to the design of the overall appearance of the course—for example, considerations about image size, screen resolution—are also useful. These are invaluable data that can significantly enhance the ability to consume educational content.

Information on students’ interests can also be considered extremely important—even though they seem to be the least accurate in terms of reliability. The course can then be adjusted with regard to whether we want to maximize the average time on page (in which case we will probably focus on supporting the strongest segments according to interest), or to look for interests that are underrepresented in terms of time on page and adjust the offer of illustrative materials accordingly.

This tool, as well as the analysis of individual visitors, allows us to monitor whether the site is well designed in terms of user interface, i.e., whether students do not have to return too much, whether they know what to click on, whether it does not have

too many short visits, etc. The analysis of individual visitors makes it possible to monitor the behaviour of individual users in the web course even in more detail and to try to adapt the flow to such generalized models. In our case, however, we do not have a sufficient amount of data for such an analysis—given the size and characteristics of the course.

Luo et al. (2015) emphasised the importance of observing international and intercultural differences, which were not so obvious in our course. However, using a location filter in analysing website navigation can, for instance, help to reveal the distinction between study strategies at school and at home. For example, in one of our online courses, we found that students studying in university libraries spent significantly less time on the course than those who studied from home. This finding could be used for the analysis of the educational environment and its friendliness in university libraries.

Romanowski and Konak (2016) provided the following traceable parameters:

- Pageviews
- Unique Pageviews
- Average Time on Page
- Entrances
- Bounce Rate
- % Exit
- Browser
- Operating System

In our overview, we have not yet addressed the parameter New vs Returning Visitors (Entrances). While it gives the opportunity to monitor certain regularity, it is somewhat problematic because the IP address (ID) of users changes over time. This parameter is therefore extremely difficult to interpret, especially in relation to a longer-term course.

Bounce Rate indicates how many visitors leave the site without taking any action there. In our research, we filtered these users out, but partly not rightfully—they include those who come to the page, read it, do not click on anything and leave. Theoretically, it can include users who were able to get the information needed, which they were looking for, for example, by coming through a web search engine. These are one-page visitors.

% Exit determines for each page the percentage of users who leave the site after visiting the page. In our course, this measure is relatively difficult to make use of. It is meaningful in particular when there are large disproportions between pages—then we can look for reasons that keep users on the page or drive them away.

Specific possibilities are offered by the analysis of partial content for heat map creation, which could contribute to a deeper understanding of study mechanisms (Černý, 2020; Kirsh et al., 2019; Pilarcikova, 2019). These options are not offered directly by Google Analytics, but it is possible to use its component (Google Tag Manager) to insert other tracking codes on the page, for example from Hotjar or Smartlook. Their analysis is in general rather complex, but it is possible to measure for each course the typical length of page scrolling (in other words, the degree of finishing reading of content), but also to identify specific page locations where students pause.

In our course, these locations were, for instance, bars with additional tasks (text download, video, worksheets, presentations), while text links were clicked much less by students. The names of tools had the highest number of clicks, while other additional sources seemed unattractive to students. These tools can also be used for tracking the movement of the cursor on the page and trying to estimate the places that students will find interesting. In line with the findings of our previous research studies, the places associated with headings and bulleted lists are more attractive than continuous text. All these data are valuable for the design of the course. The focus group

showed that students would appreciate some bullet point summaries or keywords, which clearly corresponds to their increased interest in distinct elements in the text.

The last Google Analytics parameter, which we have not mentioned and was mentioned in Luo et al. (2015) is the source of traffic, i.e., from where the users navigated to the website. In our case, these were primarily direct links, either from email or from social media, disseminated by teachers. In general, this parameter might be a useful tool for studying, for example, community dissemination of educational content.

3.5 What are the strengths and limitations of using Google Analytics to analyse online learning data?

Google Analytics can be deployed both in a website course and in a mobile application. Its main advantages are cost, ease of use, but also the ability to work with more complex statistics involving multiple variables (as was the case in Luo et al. (2015) who observed that US students had a different learning behaviour in their course than others users).

Romanowski and Konak (2016) applied the general proclamation that Google Analytics can be used to optimize websites. Thus, their goal was not only to describe study behaviour, but above all to improve the service. As this is the purpose for which the tool was designed, it provides a very good, methodologically exact and fast procedure for editing the site. When we make a comparison with the realm of paper textbooks, there is no adequately functional tool or methodological process of development.

According to Luo et al. (2015), Google Analytics appears to be quite effective in providing an overview of the online learning process and generating summary statistics, such as sessions, users, pageviews, study time, and bounce rate over time. Hence, it provides basic statistical tools that give a rough and anonymized idea of how the course works. At the same time, they draw attention to the visualization tools that can significantly accelerate and facilitate the work of the course designer as one of the strengths of the analytical solution. On the other hand, the absence of the opportunity to work effectively with an individual student, both in terms of overviews for the student and for the teacher, is identified as a weak point.

Rohloff et al. (2019) view as an advantage the availability of the product as a cloud service, which eliminates the need to implement it in any special way or work on its security or upgrade. Given that it is the most widespread service of its kind, there is a large amount of literature on how to use it effectively and how to interpret individual data. Another advantage is the number of analytical tools that the service provides.

The statistics, which we have already analyzed above, can also be counted as strengths. An interesting feature is the ability to combine data from multiple courses into one environment and then compare them with each other. For example, we stated in the introduction to the results that the average time spent on the site per visit is 10:36, but it is actually a problematic piece of data. For a university course we run at Masaryk University (Creative work with information) it is 7:58 and for another university course (Digital competence development course) 11:18. Luo et al. (2015) worked with a time of 4:38 in their course. The time certainly depends on the specific form of the course, but simultaneously we can say that the time measured in our course belongs to the top band of our research experience. We can make other similar comparisons. Using an identical tool provides a very strong basis for a comparative methodological analysis.

We believe that especially for larger courses, Google Analytics, possibly together with other tools, can serve as a very good instrument for researching the entire educational environment and also as a means of optimizing the length of pages, their structure, but also the graphic design. This seems to be one of the most problematic points at present—teachers require more

pictures, students are satisfied and the data in this course do not provide any basis for expert decisions. At the same time, there seems to be a lack of research that would incorporate this topic into a broader framework in an exact way.

The question of data interpretation appears to be in the grey zone. Drawing on the findings of our previous research, we may say that the time spent on the site is related to what the student learns. However, we will not dare to say whether this is a causal connection with a clear analytical expression. And the interpretation of these data can also be generally more complex (for example, What about sites that have more complex content than others?), although no consistent theory based on at least partial empirical conclusions has been provided.

A considerable disadvantage can be the issue of data consistency, which is related to changing user addresses and accounts. For example, in Moodle, we obtain consistent data on the behaviour of each individual user (Liu et al., 2019), which of course offers significantly broader analysis options. When we consider Google Analytics in terms of the generally stated aims of learning analytics, the possibility of intervening in favour of individual students, offering them information about their study behaviour or having the opportunity to work effectively with the overall course journey is completely missing. It cannot be used to personalize educational content. Another issue is the reliability of data (Rohloff et al., 2019) in connection with various implementations of the tracking code, blocking tools or VPN, which can change, for instance, the geolocation data.

For small courses, such as the one we analyzed in this study, the small number of participants is a significant limit - web analytics offers very interesting results when the number of views per page reaches at least the level of higher tens or hundreds; demographic tools are ideal for samples size over one thousand. All these factors play in favour of the implementation of these tools into large courses or even into MOOCs. Working with data of this kind in a small sample research is rather difficult.

4 Discussion

In this paper, we attempted to offer answers to six research questions, which in a particular way cover the topic of the possibility and meaningfulness of using Google Analytics for learning analysis, especially for research into the online learning environment and the processes involved. We have clearly demonstrated that, at least at the level of the development of an environment such as a web service, this tool plays an unquestionable role and deserves appropriate attention.

So far, the research discourse (Moissa et al., 2014; Luo et al., 2015; Romanowski & Konak, 2016) has followed a path that sought primarily to compare Google Analytics with the tools offered by conventional LMS and possibly to consider enhancing Google Analytics with other data in order to obtain a more comprehensive picture, which is associated with the possibility of a deeper and broader interpretation of data. Our research has shown that the paradigm can be reversed and we can ask not what features are missing in Google Analytics to make it a learning analytics tool, but what common learning analytics tools lack when it comes to using them for designing a web service.

In fact, almost all online learning platforms and LMSs are websites that have been supplemented with specific features. This, however, does not mean that it would not be desirable to approach them as websites. As Rohloff et al. (2019) point out, Google Analytics is commonly used in systems such as Coursera or Open Edx, but it is not so often discussed. We believe that, in the light of our study, this lack of a discussion is a serious shortcoming that limits the possibilities for effective innovation in education.

The aim of this study was to provide an outline of some of the possibilities that Google Analytics offers not only as a tool for studying specific open online web courses, but above all as an essential component for research of the entire educational

environment and the web as such. It is in our opinion slightly disturbing that we are able to measure the correlations between the opening of selected materials and the test results without asking questions important to the web environment, such as: What are the interests of our students? How do they interact with specific materials? What technologies are available to them? How do working on a mobile device and on a desktop differ?

Let us illustrate the benefits of using Google Analytics by another example. If we decided to implement study materials in PDF in our course, then thanks to data from Google Analytics, we know that:

- In about 89% of cases, our users have a browser that supports direct viewing of PDF files, which means that working with this format will not be a problem for most of them.
- We will prepare the material so that it respects the minimum resolution of 1366x768 (at least 70% of users) and the widescreen 16:9 screen format. At the same time, however, we know that this is a preference that will not be common to all users. We will work with a colour depth of 24 bits.
- Design for mobile devices does not need to be addressed, as studying on mobile phones does not show web analytics parameters that would be desirable for the course.
- We know that a substantial part of users have interests in the field of book or music culture, which we can use for the design and examples in specific materials, or for choosing illustration and the style of typesetting.

Therefore, if we decide that we want to include such study materials in our educational environment, we have a relatively solid basis for such a decision, not only in terms of a binary choice, but also in terms of the possible form of the material.

This type of information may be perceived as too technical or educationally uninteresting, but in reality it turns out that knowledge of this information can be as important for the work of a designer or creator of online education as commonly computed models of academic failure. This is not to say that standard learning analytics tools would not be useful, but that it is probably necessary to significantly expand the perspective that we take when approaching them. Web analytics in this area (not only Google Analytics, but also Smartlook, Hotjar, and others) offer opportunities that go far beyond the usual framework for thinking about online education and its analysis. At the same time, this approach makes it possible to invite a larger number of experts who are used to working with web analytics tools into the process of developing an educational environment.

After appropriate training—focusing on the transfer of the context and conceptual framework—teachers can use dashboards to monitor how students work with their materials. It seems that the environment as such is not perceived as a challenging barrier, but that it is more difficult to properly understand the data presented. However, the well-designed method of data visualization in the Google Analytics environment is a great support for this process (Luo et al., 2015; Romanowski & Konak, 2016).

4.1 Research limitations

A methodologically important question that has a great influence on the interpretation of data is the extent to which the online course is open (Allen & Seaman, 2011; 2013) or closed. If we have a course that is primarily intended for students of a particular educational institution (or institutions), but is also designed as a commonly available indexed website, we need to consider to what extent the behavioural and demographic information reflects student behaviour and to what extent this information is related to external visitors. In this respect, we must draw attention to the significant limitations of our research—we cannot effectively distinguish between “our” and “outside” students. However, with regard to the research sample

and research questions, we do not consider this limitation to be essential.

A significant limitation pointed out by Rohloff et al. (2019) is the question of the quality of the measured data. In our case, we used JavaScript to implement web analytics (Google Analytics), which is the most common and easiest way to implement measurable data into a course. The reliability of this measurement can be affected by a number of factors that cannot be effectively quantified and incorporated into the analytical process—these are tools for blocking measurement codes (e.g., *Analytics Blocker*), slow script loading, different measurement results in different browsers, etc.

Our analysis cannot cover all areas of study behavior, but only those that are visible on the web through web analytics. This reductionist approach is necessary. Our research aims not to follow the individual's perspective, but above all, to improve at the level of course design (both at the level of information architecture and, for example, thematic). Therefore, it is important to compare data from web analytics with qualitative research data (interviews, focus groups, observations, user testing, etc.)

4.2 Research ethics

Cooper (2014) pointed out that one of the issues of research ethics with regard to the use of web analytics is the fact that most tools store data about students outside researcher institution. This results in a loss of control over the data, but on the other hand also in ensuring data security. In this context, we believe that the ability of companies such as Google to secure data is significantly higher than in the case of local repositories. With regard to GDPR implementation (Goldberg et al., 2019; Dabrowski et al., 2019), in most tools (Google Analytics, Smartlook, Hotjar, etc.) the data are stored in the form of a hash record, which means that it is very difficult to identify a specific user.

The available data thus have the character of typical macro perspective data, which provide information about the whole population of users or its segment, but do not offer the possibility to identify an individual user. An individual user is identified by a given hash record (for example in Google Analytics marked as “1140912129.1598532108”), which can be tracked individually, but it is not possible to link it to a specific person without using another system (Rohloff et al., 2019).

For such identification to be possible, collaboration would be required between the site user and the researcher who could assign a specific person to the hash record based on specific behaviour. However, such a procedure is ethically unproblematic.

5 Conclusions

In our study we have offered probably the broadest and most systematic view of the use of Google Analytics in education. It is in line with the proposition of Luo et al. (2015) that a sound knowledge of other information sources is essential for a good understanding of data. Contrary to currently prevailing discourse, we decided to lean towards qualitative methods (interviews, focus groups) capable of capturing the topic of web analytics in a new context, which has been so far examined only to a small extent, perhaps with the exception of digital ethnography. Although it is an approach that is not widely applied in the field of education, we find it is very fruitful.

From the point of view of further research, we can distinguish the path of a deeper integration of these methods, on the one hand, and their extension to typologically completely different courses, on the other hand. Our research differed from the prevailing discourse in another important aspect—we followed relatively small populations, i.e., not MOOC courses, where standard scientific support can be expected, but rather smaller

courses, which remained partially neglected in the field of education in relation to web analytics.

We believe that we have succeeded in creating a study that will stimulate broader research into the educational environment, based on the action research paradigm, capable of offering students educational content that will be relevant to them and will have a form that will suit them.

Literature:

1. Ali L, Hatala M, Gašević D, Jovanović J. A qualitative evaluation of evolution of a learning analytics tool. *Computers & Education*. 2012 Jan 1;58(1):470-89.
2. Allen IE, Seaman J. *Going the distance: Online education in the United States*, 2011. Sloan Consortium. PO Box 1238, Newburyport, MA 01950; 2011 Nov.
3. Androutsopoulos J. Potentials and limitations of discourse-centred online ethnography. *Language@ internet*. 2008 Sep 4;5(8).
4. Anonymus. (2018)
5. Anonymus. (2020)
6. Baker RS, Inventado PS. Educational data mining and learning analytics. In *Learning analytics 2014* (pp. 61-75). Springer, New York, NY.
7. Brouwer N, Bredeweg B, Latour S, Berg A, van der Huizen G. Learning analytics pilot with coach2-Searching for effective mirroring. In *European Conference on Technology Enhanced Learning 2016 Sep 13* (pp. 363-369). Springer, Cham.
8. Chatti MA, Dyckhoff AL, Schroeder U, Thüs H. A reference model for learning analytics. *International Journal of Technology Enhanced Learning*. 2012 Jan 1;4(5-6):318-31.
9. Chitkara B, Mahmood SM. Importance of Web Analytics for the Success of a Startup Business. In *International Conference on Recent Developments in Science, Engineering and Technology 2019 Nov 15* (pp. 366-380). Springer, Singapore.
10. Clifton B. *Advanced web metrics with Google Analytics*. John Wiley & Sons; 2012 Mar 30.
11. Cooper A. Learning analytics interoperability-the big picture in brief. *Learning Analytics Community Exchange*. 2014 Mar.
12. Cooper A. What is analytics? Definition and essential characteristics. *CETIS Analytics Series*. 2012 Nov;1(5):1-0.
13. Cutroni J. *Google Analytics: understanding visitor behavior*. "O'Reilly Media, Inc."; 2010 Aug 13.
14. Dabrowski A, Merzdovnik G, Ullrich J, Sendera G, Weippl E. Measuring cookies and web privacy in a post-gdpr world. In *International Conference on Passive and Active Network Measurement 2019 Mar 27* (pp. 258-270). Springer, Cham.
15. Dimopoulos I, Petropoulou O, Boloudakis M, Retalis S. Using Learning Analytics in Moodle for assessing students' performance.
16. Downes, S., & Siemens, G. CCK08-The distributed course. The MOOC guide. 2008; 42. Available from: <https://sites.google.com/site/themoocguide/3-cck08---the-distributed-course> [Accessed 19th January 2020]
17. Einhardt L, Tavares TA, Cechinel C. Moodle analytics dashboard: A learning analytics tool to visualize users interactions in Moodle. In *2016 XI Latin American Conference on Learning Objects and Technology (LACLO) 2016 Oct 3* (pp. 1-6). IEEE.
18. Fini A. The technological dimension of a massive open online course: The case of the CCK08 course tools. *International Review of Research in Open and Distributed Learning*. 2009;10(5).
19. Goldberg S, Johnson G, Shriver S. *Regulating Privacy Online: The Early Impact of the GDPR on European Web Traffic & E-Commerce Outcomes*. Available at SSRN 3421731. 2019 Jul 17.
20. Google. *Analyze your data with Users Flow*. Help Analytics. 2020. Available from: <https://support.google.com/analytics/answer/1713056> [Accessed 19th January 2020]
21. Guan C, Jiang Z, Ding D, Wang Y, Lee DK. *Web Analytics*. World Scientific Book Chapters. 2020:143-59.
22. Jiang M, Ting E. A study of factors influencing students' perceived learning in a web-based course environment. *International Journal of Educational Telecommunications*. 2000;6(4):317-38.
23. Kirsh I, Joy M. A Different Web Analytics Perspective Through Copy to Clipboard Heatmaps. In *International Conference on Web Engineering 2020 Jun 9* (pp. 543-546). Springer, Cham.
24. Ledford JL, Teixeira J, Tyler ME. *Google analytics*. John Wiley and Sons; 2011 Feb 2.
25. Liu DY, Atif A, Froissard JC, Richards D. An enhanced learning analytics plugin for Moodle: student engagement and personalised intervention. In *ASCILITE 2015-Australasian Society for Computers in Learning and Tertiary Education, Conference Proceedings 2019 Jan 1*.
26. Liu S, Mouri K, Ogata H. Learning Analytics Data Flow and Visualizing for Ubiquitous Learning Logs in LMS and Learning Analytics Dashboard. In *International Conference on Human-Computer Interaction 2020 Jul 19* (pp. 548-557). Springer, Cham.
27. Luo H, Rocco S, Schaad C. Using Google Analytics to understand online learning: A case study of a graduate-level online course. In *2015 International Conference of Educational Innovation through Technology (EITT) 2015 Oct 16* (pp. 264-268). IEEE.
28. Markham AN. The methods, politics, and ethics of representation in online ethnography. In *The Sage Handbook of Qualitative Research*, SAGE, Thousand Oaks, CA 2005.
29. Mc Guckin C, Crowley N. Using Google Analytics to evaluate the impact of the CyberTraining project. *Cyberpsychology, Behavior, and Social Networking*. 2012 Nov 1;15(11):625-9.
30. Moissa B, de Carvalho LS, Gasparini I. A web analytics and visualization tool to understand students' behavior in an adaptive e-learning system. In *International Conference on Learning and Collaboration Technologies 2014 Jun 22* (pp. 312-321). Springer, Cham.
31. Montgomery AL, Li S, Srinivasan K, Liechty JC. Modeling online browsing and path analysis using clickstream data. *Marketing science*. 2004 Nov;23(4):579-95.
32. Murthy D. Digital ethnography: An examination of the use of new technologies for social research. *Sociology*. 2008 Oct;42(5):837-55.
33. Omidvar MA, Mirabi VR, Shokry N. Analyzing the impact of visitors on page views with Google analytics. *arXiv preprint arXiv:1102.0735*. 2011 Feb 3.
34. Phippen A, Sheppard L, Furnell S. A practical evaluation of Web analytics. *Internet Research*. 2004 Sep 1.
35. Pink S. Digital ethnography. *Innovative methods in media and communication research*. 2016 Dec 26:161-5.
36. Rohloff T, Oldag S, Renz J, Meinel C. Utilizing web analytics in the context of learning analytics for large-scale online learning. In *2019 IEEE global engineering education conference (EDUCON) 2019 Apr 8* (pp. 296-305). IEEE.
37. Romanowski B, Konak A. Using Google Analytics to Improve the Course Website of a Database Course. In *ASCE Mid-Atlantic Regional Conference Papers, October 21-22 2016*.
38. Ruth A, Hackman J, Brewis A, Spence T, Luchmun R, Velez J, Ganesh TG. Engineering Projects in Community Service (EPICS) in High Schools: Subtle but potentially important student gains detected from human-centered curriculum design. *Education Sciences*. 2019 Mar;9(1):35.
39. Siemens G, Long P. Penetrating the fog: Analytics in learning and education. *EDUCAUSE review*. 2011;46(5):30.
40. Siemens G. Learning analytics: The emergence of a discipline. *American Behavioral Scientist*. 2013 Oct;57(10):1380-400.
41. Siemens G. Learning analytics: The emergence of a discipline. *American Behavioral Scientist*. 2013 Oct;57(10):1380-400.
42. SoLAR. What is Learning Analytics?. The Society For Learning Analytics Research (Solar). 2020, Available from: <https://www.solaresearch.org/about/what-is-learning-analytics/> [Accessed 19th January 2020]
43. Tonkin S, Whitmore C, Cutroni J. Performance marketing with Google Analytics: Strategies and techniques for maximizing online ROI. John Wiley and Sons; 2011 Jan 21.
44. Varis P. *Digital ethnography*. The Routledge handbook of language and digital communication. 2016:55-68.

45. W3Techs. 2020. Available from: <https://w3techs.com/technologies/details/ta-googleanalytics/all/all> [Accessed 19th January 2020]

46. Wang G, Konolige T, Wilson C, Wang X, Zheng H, Zhao BY. You are how you click: Clickstream analysis for sybil detection. In 22nd {USENIX} Security Symposium ({USENIX} Security 13) 2013 (pp. 241-256).

Primary Paper Section: A

Secondary Paper Section: AM, AF

ELECTROACOUSTIC MUSIC AND THE SLOVAK MUSICAL AVANT-GARDE IN THE 1960S

³ALENA ČIERNA

Department of Music, Faculty of Education, Constantine the Philosopher University in Nitra
Dražovská 4, 949 01 Nitra, Slovakia
email: ³acierna@ukf.sk

Abstract: In the 1960s, the development of music in Slovakia was marked by prominent generational and stylistic confrontations of the compositional poetics of the previous generations of composers and the just emerging one. In the composers' community, an initiative was gaining a foothold that reassessed the practices, norms, and achievements of the previous developmental stages of Slovak music and looked for new points of departure. In certain stages of the given period, the first graduates of the Academy of Performing Arts (Iľja Zeljenka, Juraj Pospíšil, Pavol Šimai, Ladislav Kupkovič, Peter Kolman, Roman Berger, Jozef Malovec, Miroslav Bázlik, Ivan Parik, Tadeáš Salva, and others) entered the musical scene. The genesis and the formation of the Slovak musical avant-garde in the 1960s was determined by their quest for the novel possibilities of expression and the compositional techniques of the so-called New Music of Western Europe. They included experimenting with previously unknown electrogenic compositional materials and techniques of electroacoustic music. Slovak electroacoustic music, which achieved success in Slovakia and abroad already in the 1960s, emerged first on a private basis, later in the Sound Studio of the Czechoslovak Television, and, primarily, in the Experimental Studio of the Czechoslovak Radio.

Keywords: Slovak musical avant-garde, electroacoustic music, 20th century

Introduction

In the early 1970s,¹ a discussion took place in the premises of the Association of Slovak Composers (ASC) under the title *Electronic Music and the Problems Associated With It*. Its title might evoke efforts to grasp the technological issues of electroacoustic music and the problems associated with its production and reproduction. Its main point, however, consisted of a lot more fundamental issues. Does electroacoustic music have a place in the musical culture of socialist Slovakia? Is it legitimate in the given time? Do composers of electroacoustic music have the right to receive remuneration for their compositions? In the context of the development of European music in the latter half of the twentieth century, however, electroacoustic music had already been born, achieved its maturity,² and was regularly played at concerts and festivals of contemporary music and broadcast on the radio. Although the development of music in Slovakia was delayed even in the twentieth century compared to its development in Europe, Slovak electroacoustic music had already had a history at the time of the above-mentioned discussion. The genesis of electroacoustic music in Slovakia falls in the latter half of the 1950s. Consequently, the Slovak composers present at the discussion about the "problems of electroacoustic music" had already gained significant compositional experience with electrogenic material and achieved their first successes in Slovakia and abroad.

1 Socio-Ideological Points of Departure

The development of music in Slovakia after World War II was a dynamic, polystylistic, and contradictory process. It was determined by both the historical-social context and the immanent development of European music in the latter half of the twentieth century. Moreover, a third factor, the inner incentives of the composers searching for their own areas of creativity, must not be disregarded, either. Therefore, three

aspects should be considered when examining the conditions for the development of musical creativity in Slovakia. On the one hand, these acted as a dynamizing factor and, on the other hand, as a retarding factor of development:

- external determinants – the socio-historical development of the society after 1945, especially after 1948,
- the integration of Slovak music into the European (especially Central European) context of music while maintaining the essential features of Slovak music (distinct from other European cultures),
- the own internal development of Slovak music, unfolding from the various points of departure and from the various attitudes of the composers.

In the latter half of the twentieth century, conditionality and dependence on the socio-political context is obvious in the development of Slovak music and musical culture. It was this conditionality that became the basis for the periodization of the history of Slovak music in the twentieth century presented in several specialized publications and reflections.³ After all, in the given period of 1948 – 1970, many ideological aspects clearly reflected in the generic and stylistic profiling of Slovak music.

Immediately after the war, the state authorities in Slovakia focused their efforts on creating the material and organizational conditions for the management of culture. This translated into a gradual professionalization of the musical life and the nationalization of the existing cultural institutions.⁴ With respect to the changes in the social system after February 1948, and in the spirit of the new culturo-political strategies, the efforts to complete the process of creating an institutional background intensified.⁵ At the same time, a system of an ideologically motivated management of culture and artistic productions by the ideological professional Association of Czechoslovak Composers was being formed.⁶

Shortly after February 1948, "socialist realism"⁷, implemented from the Soviet Union, became the only correct and binding aesthetic doctrine for any works.⁸ The basic attributes of this doctrine included: "democratization" (application of the creative output to a wide range of recipients), "comprehensibility" (simplification of the means of expression), "folksiness"

³ See: Chalupka, L.: Vývoj hudby po roku 1945 [The Development of Music after 1945]. In: ELSCHKEK, Oskár [ed.]: *Dejiny slovenskej hudby*. Bratislava: SAV – ASCO Art & Science, 1996, pp. 273 – 329; Chalupka, L.: *Generačné a štýlové konfrontácie: Sprievodca slovenskou hudbou 20. storočia II (1951 – 2000) [Generational and Stylistic Confrontations: A Guide to Twentieth-Century Slovak Music II (1951 – 2000)]*. Bratislava: Comenius University in Bratislava, 2018, pp. 131 – 146; Chalupka, L.: *Slovenská hudobná avantgarda [The Slovak Musical Avant-Garde]*. Bratislava: Faculty of Arts of Comenius University, 2011, pp. 1 – 111.

⁴ The Academy of Music and Drama for Slovakia was nationalized (and its name was changed to State Conservatory in Bratislava) already during the war, in 1941; the Opera of the Slovak National Theatre (SNT) was nationalized in 1945 and, subsequently, the Operetta Department of the Nová Scéna Theatre in Bratislava was formed by the detachment of the Operetta Ensemble of SNT; in 1945, the opera in Košice was also nationalized (it had been linked to the Central Slovak Opera Theatre); the activities of the Seminar for Musicology at the Faculty of Arts of Comenius University were resumed; in 1946, the Mixed Choir (which later became part of the Slovak Philharmonic) was formed in the Czechoslovak Radio in Bratislava on the initiative of the conductor Ladislav Slovák.

⁵ 1949 – establishment of the Slovak Philharmonic and the Academy of Performing Arts; 1949 – establishment of the folklore ensembles Lúčnica and the Slovak Folk Art Collective (later on, folklore ensembles of ethnic minorities were also formed); 1950 – Centre of Music and Arts (the later Concert and Theatre Bureau, then the Slovkoncert agency, today the Music Centre) and the Bratislava Musical Spring festival (the present-day Bratislava Music Festival); 1950 – Slovak Musical Publishing House (from 1960 the State Music Publishing House, since 1971 OPUS), Institute of Musicology of the Slovak Academy of Sciences and the Military Art Ensemble; 1954 – Slovak Music Fund (the present-day Music Fund);

⁶ The Association of Czechoslovak Composers was formed on 15 May 1949 by the merger of the Syndicate of Czech Composers and the Club of Slovak Composers. Both Czech and Slovak composers had been under the aegis of the Association of Czechoslovak Composers until 1955 when a separate Association of Slovak Composers (ASC) was formed from its Slovak section as the managing ideological body for composition.

⁷ As documented by the presentations of Zdeněk Nejedlý and Ladislav Štoll at the Convention of National Culture in Prague (10 – 11 April 1948). After Chalupka, 2018, pp. 18 – 67.

⁸ First declared in the Soviet Union at the convention of Soviet writers in 1934 by the writer Maxim Gorky.

¹ This so-called discussion took place on 3 December 1971 with the participation of the representatives of the social organizations connected to art music: Andrej Očenáš (1911 – 1995, the president of the Music Fund Slovakia), Oto Ferenczy (1921 – 2000, a representative of the Association of Slovak Composers), Ing. Peter Janík (a sound engineer of the Experimental Studio of the Czechoslovak Radio in Bratislava), and composers who had been interested in electroacoustic music already in the 1960s – Miro Bázlik (1931), Roman Berger (1930 – 2020), Peter Kolman (1937), Jozef Malovec (1933 – 1998), Juraj Pospíšil (1931 – 2007), and Iľja Zeljenka (1932 – 2007). The "discussion" was led and chaired by their peer, composer Juraj Hatrk (1941 – 2021). See: Godár, V.: *Slovenská hudba a normalizácia [Slovak Music and Normalization]*. In: *Slovenská hudba*, 22, 1996, no. 1 – 2, pp. 112 – 120.

² At that time, the French *musique concrète* had already had an over twenty-year-old history and the German *elektronische musik* and the American *music for tape* were only a few years younger.

(orientation to folklore traditions), “nationality” (identification with past and present national elements), “programme” (requirement for clear contents), and “realism” (direct reflection of the reality). Finally, there was a requirement for party affiliation in terms of agreement with the cultural policy of the ruling communist party and for the right orientation in the post-war, class-wise divided world. The prompt implementation of these criteria into composition was the task of the Association of Czechoslovak Composers, an ideological-professional organization completely subject to the rule of the communist party and its cultural policy. This system found its support in printed and electronic media, as well as in newly established specialized journals.⁹

As Ľubomír Chalupka stated, the fact that Slovak composers accepted the totalitarian management practices of the society relatively quickly (and even with understanding) and that they identified themselves with the views, mottoes, and instructions of the Association of Czechoslovak Composers and adopted the creative methods of socialist realism is rooted in the previous stages of development.¹⁰

With respect to the penetration of the influences from the socio-political developments into the sphere of musical life and to the generational and stylistic confrontations of the works of Slovak composers, the 1950s may be divided into several periods in Slovak music. The first period (1948 – 1953) is characterized by the introduction of totalitarian ideology, which manifested itself most prominently in the field of compositional theory and practice. The second period (1953 – 1956) is marked by minor changes in the existing creative strategies. The third period (1956 – 1960) is distinct with two conflicting tendencies in the works of the composers: on the one hand, they returned to the practices of the first period and, on the other hand, their inner self-reflection and critical stance to dogmatism arose.¹¹ In the development of Slovak music, retarding tendencies clearly appeared in the 1950s in the works of the composers of the older generation, who were content with their achievements. At the same time, under the influence of external socio-political realities, a change occurred in the strategy of cultural policy which, along with the criticism of the previous monostylistic development, led to a significant dynamization of the development of composition.¹² One of the essential conditions for making the musical development more dynamic was to learn about the European musical output of the twentieth century. The awareness of it gradually increased and cultural contacts with western music were enlivened both in official¹³ and private ways.¹⁴

⁹ Critiques, reports, reviews, and essays regularly appeared in the daily press (*Kultúry život [Cultural Life]*, *Práca [Work]*, *Pravda [Truth]*, *Lud [People]*, *Sloboda [Freedom]* etc.). In September 1948, the existing Czech specialized periodicals *Rythmus [Rhythm]* and *Tempo* were cancelled and replaced in the same year by the periodical *Hudební rozhledy [Musical Outlook]* with nationwide distribution. *Hudební rozhledy* mapped in detail all the contributions, discussions, and reports from the conventions and other professional meetings. Its 1948 to 1989 issues represent unique source materials for forming an idea about the musical life in Czechoslovakia and for understanding how totalitarian practices, and even “brainwashing”, worked at that time. The editions of the monthly *Slovenská hudba [Slovak Music]*, on whose pages the development of ideas and the confrontations of views and attitudes to the direction of Slovak music can also be traced, date to the years 1957 to 1971. Due to the progressive orientation of this monthly after Oskár Elschek became its editor-in-chief, reflecting the development and the compositional techniques of “western” music, *Slovenská hudba* was cancelled after 1971 and was resumed only in 1991.

¹⁰ See Chalupka, 2018, pp. 20 – 21.

¹¹ For more details, see Chalupka, 2018, pp. 18 – 37.

¹² In February 1956, at the Twentieth Convention of the Communist Party of the Soviet Union (CPSU), Nikita Khrushchev delivered a speech in which he condemned Stalin’s power practices. This speech became a signal for the criticism of the existing dogmatic system. The Second Convention of the Association of Czechoslovak Writers (1956) responded swiftly to the conclusions of the Twentieth Convention of CPSU and raised ideas about the revival of the development of literature as a true creative process with all the contradictions of writing. A cautious but still clearly communicated effort to revise the existing practices occurred also in Slovak and Czech music. This is evident from the radical writing of the composer and musicologist Ladislav Burlas entitled *Myšlienky o vývine národnej hudby [Thoughts on the Development of National Music]* (see *Slovenská hudba*, 1, 1957, no. 2, pp. 54 – 61).

¹³ A positive role in this respect, and also with regard to the development of Slovak music, was played by the Warsaw Autumn festival of contemporary music, organized for the first time in Warsaw in 1957.

¹⁴ It was through private channels that scores, books, and journals published in Western European countries, containing information about novel compositional techniques, made their way to Bratislava. The proximity of the Viennese radio, which

Despite the above-mentioned obvious conditionality and dependence of the development of Slovak music on the socio-political situation of the 1950s, we cannot disregard the fact that, in the post-war era, Slovak music experienced a growth in its professionally trained, talented creative base in both the compositional and the performance sphere. In the subsequent decade, this factor translated into the acceleration of the musical life and musical output, especially thanks to the emergence of a new, young generation of composers who graduated from the Academy of Performing Arts in Bratislava.

2 The Emergence and the Formation of the Slovak Musical Avant-Garde in the 1960s

In the 1960s, the development of music in Slovakia was marked by prominent generational and stylistic confrontations of the compositional poetics of the previous generations of composers and the just emerging one. Several tendencies reflected in composition:

- a) confirmation of the existing stylistic points of departure,
- b) innovation and enrichment of the acquired individual stylistic poetics,
- c) quantification of the output of less significant composers,
- d) adoption of new stylistic points of departure, which negated the previous direction and were oriented towards the genesis of an avant-garde line.¹⁵

Contrary to the previous period, the generational and stylistic profiling of Slovak music in the 1960s took place in a more favourable socio-political situation. As mentioned above, the dogmatism of culture management and monostylism under the aegis of socialist realism had been criticized already in the late 1950s. In the 1960s, the socio-political pressure on composers was not that massive. Discussions began about the “socialist” character of music and the role of ASC and its transformation from an ideological to a professional organization. In the composers’ community, an initiative was gaining a foothold that reassessed the practices, norms, and achievements of the previous developmental stages of Slovak music and looked for new points of departure in the novel compositional trends and phenomena of Western European music. Slovak music was no longer to be closed within itself or within the circle of cultures that belonged to the so-called Eastern Bloc, but it was to be integrated into the Central European context.

However, in the 1960s, these initiatives were not easy to implement in the field of art music. In the early sixties, the postulates enforced in the 1950s about the “right”, i. e., socialist, development of Czechoslovakia still lingered on.¹⁶ Nevertheless, in 1962, the Twelfth Convention of the Communist Party of Czechoslovakia (CPCS, 4 December – 8 December 1962) admitted the mistakes that had been committed in the 1950s. Another positive thing was the annulment of the original accusations of “bourgeois nationalism” inflicted on Slovak writers and the intelligentsia (mainly the representatives of social sciences). These momentums led to a dynamic progress not only in social sciences, but also in arts. The liberalization of the socio-cultural conditions, however, was not accepted by the representatives of the official political circles without reservations. The representatives of totalitarian power were reluctant to renounce their practices in the management of society and culture. In addition, they were concerned that the path of liberalization might pose a direct threat to the idea of a single right path for development in “socialist” Czechoslovakia. That is also why reservations were voiced at the Thirteenth Convention of CPCS in 1966 (31 May – 4 June 1966) against “slipping” into liberalism, questioning the leading role of CPCS,

regularly broadcast twentieth-century Western European compositions, also played a positive role in Bratislava.

¹⁵ For more details, see Chalupka, 2018, pp. 131 – 149.

¹⁶ In 1960, this tendency was confirmed by the new constitution that declared Czechoslovakia the Czechoslovak Socialist Republic.

revising the doctrine of socialist realism, etc.¹⁷ From the aspect of the objective socio-political determinants of the development of musical culture, the entry of the Warsaw Pact troops and their occupation of Czechoslovakia (21 August 1968) may be viewed as a milestone in the periodization of the 1960s. The subsequent response of resistance and opposition was distinctively present also in the cultural and artistic milieu. This is where the conflict between the two tendencies of development manifested itself markedly: on the one hand, the right to free creativity (declared at conventions and meetings in the early sixties) and, on the other hand, the views of the political representatives about the totalitarian management of culture (facilitated by the presence of Soviet troops in the territory of Czechoslovakia).

The socio-political events translated into musical culture and composition through the resolutions of ASC, the ideological instrument for the management of composition at the time. At its first convention in 1959, ASC in its resolutions defended the monostylistic development of Slovak music based on the doctrine of socialist realism. Even after 1960, empty phrases praising “healthy socialist” compositional orientation and rejecting “ill and rotting” Western European composition did not subside completely. Nevertheless, the subsequent development proved that these claims were unsustainable.¹⁸ From 1962, several periodicals published discussions about the topical issues of Slovak composition with respect to the freedom of expression and the freedom of choice in artistic means and about the need for maintaining contact with the European artistic platform. This was confirmed even by ASC at its Second Convention (1963), which carried on in an atmosphere of liberal discussions. Against the background of these events, stylistic and generational confrontations of the views about the direction of Slovak music began to appear within the community of Slovak composers more prominently. This was noted also by the Third Convention of ASC (1967) where the participants to the discussions pondered the achieved compositional results¹⁹ in the development of music in Slovakia and the transformation of ASC from an ideological institution to a professional one.²⁰ Critical voices calling for a more radical enforcement of the freedom of artistic creations and for an effort for liberation from the continuing subordination of creation to the cultural policy of the state party were raised increasingly in the second half of 1968 and these demands grew even stronger after the Warsaw Pact invasion of Czechoslovakia (in August 1968).²¹ For a long time to come, the extraordinary convention of ASC held in February 1969 became the last platform for free discussions about the direction of Slovak music and its status in federal Czechoslovakia. The subsequent General Assembly convened by the Ministry of Culture of the Slovak Republic (in April 1970) criticized liberalism in arts and foretold a new phase, that of “normalization”, in the development of Slovak musical culture.

Several generations of composers took part in the musical developments of the 1960s in Slovakia. The members of each generation presented their individual compositional styles, which were evolving at various stages of formation. Retrospectively, we might establish that the driving force behind the dynamic development of Slovak music in the 1960s was the emerging young generation of composers with strong avant-garde ambitions. Their appearance may be divided into several phases.

The first (preparatory) phase took place from 1956 to 1959 and is characterized by the activities of the first graduates, and some of the students, of the Academy of Performing Arts in Bratislava (APA): Ilja Zeljenka (1932 – 2007), Juraj Pospíšil (1931 – 2007), Ladislav Burlas (*1927), Pavol Šimai (1930 – 2020), Ivan Hrušovský (1927 – 2001), Ladislav Kupkovič (1936 – 2016), Peter Kolman (*1937), Roman Berger (1930 – 2020), Jozef Malovec (1933 – 1998), and others. Their compositions were still timid and indecisive in style, marked by searching and getting to know oneself. At that time, avant-garde expressions were muted in the society. The young composers responded to the criticism of their compositions voiced by the members of the older generation of composers²² with increased activity and initiatives.

The second (activation) phase covers the years 1960 to 1963. The young composers were joined by others: Miro Bázlik (*1931), Dušan Martinček (1936 – 2006), Ivan Parík (1936 – 2005), Juraj Hatrík (1941 – 2021). This phase is marked by developing polystylism among the members of the emerging generation, increased output, and building creative self-confidence. The initiatives of the youth could no longer be artificially disputed in the society. The remarkable achievements of the avant-garde initiatives of young composers to adopt and experiment with compositional techniques and audio materials previously unknown in Slovak music (their first experiments with “tape music”, both privately and, later on, in the Sound Studio of the Czechoslovak Television, 1961) led to a gradual appreciation of their creative points of departure. This was also confirmed by the Second Convention of the Association of Slovak Composers (1964), which acknowledged the right of the youth to participate in the development of Slovak composition.

The third (confrontational) phase (1964 – 1967) is characterized by the crystallization of the intentions and aims of the Slovak musical avant-garde. The period of sympathizing with, and enthusiastically adopting, the techniques and means of New Music and the acceptance of the contemporaneous avant-garde orientation in Slovak music was followed by a period of critical re-evaluation. The highly diversified poetics of the young avant-garde composers were enriched by the new, fresh approaches to avant-garde composition of the other graduates of APA: Jozef Sixta (1940 – 2007), Tadeáš Salva (1937 – 1995), and Juraj Beneš (1940 – 2004). A crucial dynamizing factor in the development of avant-garde composition was the ensemble called *Hudba dneška* [Today’s Music] (1964), which became the proponent of twentieth-century Slovak and world avant-garde music. In this period, young composers began to call for a more profound transformation of the means of New Music.

The fourth, final phase (of culmination) of the Slovak musical avant-garde falls to the period of 1968 to 1970. In this phase, the homogeneous position of the young avant-garde composers was consolidated in the musical life of Slovakia both quantitatively and qualitatively. Avant-garde ambitions in Slovakia culminated in the three so-called Smolenice Seminars in 1968 – 1970.²³ During the entire decade of the sixties, the young avant-garde composers fought for the improvement of democratic conditions for local musical life and creative milieu not only in the field of composition, but also in the field of journalism and the organization of musical life. This is documented, e.g., by the

¹⁷ Proceedings *KSČ a kultúra III, 1960 – 1971 [The Communist Party of Czechoslovakia and Culture III, 1960 – 1971]*. Prague: Vysoká škola politická, 1978, pp. 37 – 134. (After Chalupka, 2018, pp. 133.)

¹⁸ From 1962, several periodicals published discussions about the topical issues of Slovak composition with respect to the freedom of expression and the freedom of choice in artistic means and about the need for maintaining contact with the European artistic platform. The papers were published not only in the *Slovenská hudba* periodical, but also in the periodicals *Slovenské pohľady [Slovak Perspectives]* and *Kultúrny život*.

¹⁹ The efforts of the composers were presented also at concerts of Slovak music (1963, 1967, 1970).

²⁰ See the papers of Zdenko Nováček and Eugen Šimúnek (in *Slovenská hudba*, 5, 1961, no. 3), Antonín Hořejš (in *Slovenská hudba*, 7, 1963, no. 2), Andrej Očenáš (in *Slovenská hudba*, 11, 1967), and others in *Slovenská hudba* from 1961 to 1971.

²¹ Slovak musicians joined the declaration of the Association of Czechoslovak Composers and the Standpoint of Scientists, Artists, and Journalists (November 1968). For the concrete activities of ASC, see the Resolution of its Extraordinary Convention (in *Slovenská hudba*, 13, 1969, nos. 4 – 5, p. 188). See Chalupka, 2018, p. 140.

²² The young composers’ new initiatives and orientation to the tools of Western European New Music were not appreciated. See, e.g., the article of Dezider Kardoš, *Rozvoj slovenskej hudobnej tvorby za posledných 10 rokov [The Development of Slovak Musical Output for the Past Ten Years]* (in *Slovenská hudba*, 3, 1959, no. 3, p. 97). The young composers could learn about the Western European musical developments only at the Seminars of Twentieth-Century Music held in the Music Theatre under the aegis of the Czechoslovak Youth Association (1959). The participants of the last Seminar (in October 1959) could also hear the electroacoustic compositions of Ernst Krenek, Herbert Eimert, and Karlheinz Stockhausen.

²³ The idea of organizing and holding an international show of avant-garde compositions was born in 1965. The seminars of contemporary music (so-called Smolenice Seminars) took place in a castle (the House of the Scientists of the Slovak Academy of Sciences) in a village called Smolenice. They were a counterpart of the Darmstadt Summer Courses of New Music. Besides concerts, the programmes included thematic lectures and workshops. During these three years, the seminars were attended, e.g., by the composers Karlheinz Stockhausen and György Ligeti, the musicologists Ulrich Dibelius, Hans Peter Reinecke, Carl Dahlhaus, and Józef Patkowski, and others.

initiatives and contributions of the composer Roman Berger and the musicologist Peter Faltin at conventions or on the pages of *Slovenská hudba*.²⁴

The last Smolenice Seminar (1970) symbolically closed the avant-garde phase in the development of twentieth-century Slovak music. Its subsequent development after 1970 terminated most of the avant-garde initiatives. Under the pressure of the socio-political events after August 1968, in the so-called normalization period, Slovak composition found itself in isolation again. Its contacts with the European development of music were discontinued. Naturally, the return of the dogma of “socialist realism” brought along the political criticism of the avant-garde tendencies in the compositions of the 1960s.²⁵

3 The Genesis of Electroacoustic Music in Slovakia

The young composers, graduates of APA in Bratislava who entered the scene of music in Slovakia in the late 1950s and during the 1960s, had their eye on the West. Despite the complex socio-political situation, whose reflection may be traced in the generational confrontations and gradual diversification of personal styles, the young composers gradually managed to assert themselves on the musical scene.

The genesis and the formation of the Slovak musical avant-garde in the sixties was determined by their quest for novel possibilities of expression and compositional techniques. They included experimenting with previously unknown electrogenic compositional materials and techniques of electroacoustic music. As pointed out above, the first, primitive experiments with “tape music” took place privately. The composers Ilja Zeljenka, Roman Berger, and Pavol Šimai, and the musicologist Ivan Mačák had only a commercial tape recorder of a Czechoslovak make, a Tesla “Sonet Duo” and a borrowed four-input mixing console available. By these experiments, they honed their aural and analytical skills and tried out new compositional techniques already in the late 1950s: the techniques of montage and collage.²⁶ The collaboration of Zeljenka and Berger in a private environment resulted in *Etude No. 1* and *Etude No. 2* (1958), and the collaboration of Zeljenka, Berger, and Šimai in *Etude No. 3* (1958). The sound of these first experiments was not known for a long time. The sound of a 1961 composition was discovered in Berger’s personal archive only in the early twenty-first century and a fragment of it entitled *Žaba!* [Frog!] (by Berger, Zeljenka, and Šimai)²⁷ was released on the CD *Iná hudba* [Other Music]: *Experimental Studios Series I* (Bratislava, 2015).²⁸

3.1 The Sound Studio of the Czechoslovak Television in Bratislava

The first impetus for the momentary fascination by sound and these “pranks” to become avant-garde artistic compositions was provided by films. Thanks to Zeljenka, Berger, and, shortly afterwards, also Malovec and Kupkovič in collaboration with the

sound engineer Ivan Stadtrucker, the first compositions utilizing electrogenic sound materials were born in the modest conditions of the Sound Studio of the Czechoslovak Television in Bratislava²⁹ (Ilja Zeljenka: *Štúdiá 0,2* [Study 0.2] for prepared piano, *Štúdiá 0,3* [Study 0.3] for tone generator – both 1962). Although the technical equipment of the Sound Studio was not completely suitable in the beginning, other composers besides the above-mentioned ones also showed interest in working in it, including Pavol Šimai, Svetozár Stračina, and the German composer Paul Dessau who arrived in Slovakia to produce an electroacoustic soundtrack for the film *Ruský zázrak* [*Russian Miracle*] (directed by a married couple, the Thorndikes).³⁰ The subordination of the studio to the needs and urgent requirements of television broadcasting pushed creative work on autonomous electroacoustic compositions to the background. Although the Sound Studio kept producing electroacoustic soundtracks for films and television productions, autonomous electroacoustic composition was still absent in the 1960s.

From August 1961 to the year 1967, soundtracks for the following short documentaries and feature films were produced in the Sound Studio of the Czechoslovak Television in Bratislava partly or completely with electroacoustic music:

- Ilja Zeljenka: *65 miliónov* [65 Millions] (1961); *Slno v sieti* [The Sun in a Net], *Dáma v čiernom* [Lady in Black] (1962); *Voda a práca* [Water and Work], *Operácia X* [Operation X], *Nezabudnutá dedina* [The Unforgotten Village], *Deň svätého Ladislava* [Saint Ladislav’s Day], *Muži z Gaderskej doliny* [Men from the Gader Valley] (1963); *Vstupujeme do doby atómovej* [We Are Entering the Atomic Age], *Stretnutie* [The Meeting], *Muži vo výškach* [Men at Height] (1964); *Každý týždeň sedem dní* [Seven Days a Week], *Zotrvačnosť* [Perseverance] (1965), *Drak sa vracia* [The Dragon Returns] (1967);
- Roman Berger: *Opustená zem* [The Abandoned Land] (1962); *Po sedemnástich rokoch* [After Seventeen Years], *Vzbura na ulici Sycamore* [Revolt in Sycamore Street] (1963); *Kam nechodí inšpektor* [Where the Inspector Does Not Go] (1964); *Tri spomienky* [Three Memories], *Analógie* [Analogies] (1965); *Čierna a červená* [Black and Red] (1967);
- Jozef Malovec: *Výhybka* [Railroad Switch] (1963); *Posledný na izbu* [The Last to the Room] (1964); *Bolo to na váš účet* [It Was on Your Account] (1966);
- Ladislav Kupkovič: *Nezmar hneď* [Brown Hydra] (1961); *Magazín* [Magazine] (1962); *Infarkty* [Heart Attacks], *Výskum materiálov* [Material Research], *Otec turbín* [The Father of Turbines] (1964); *Reumatická horúčka* [Rheumatic Fever], *Trenie* [Friction] (1965);

The first attempt at autonomous electroacoustic composition in the Sound Studio was a music for the ballet *Kozmos* [Cosmos] (1963) composed by Ilja Zeljenka, which remained fragmentary because the choreographer Tóth gave up the project. Another attempt was Wiliam Bukový’s music for the ballet *Faust* which was being created while working on the soundtrack of the film *Automat na přání* [Wishing Machine]. The completion of the project was prevented by the death of the composer. As a result of the worsening social conditions and the growing political pressure on artistic television productions, the experimental projects of the Sound Studio were tolerated rather than supported. The subsequent structural and staff reorganization

²⁴ For more information on the genesis and development of the Slovak musical avant-garde and their representative compositions, see: Chalupka, L.: *Slovenská hudobná avantgarda*. Bratislava: Faculty of Arts of Comenius University, 2011.

²⁵ Due to the cultural policy situation and the awareness that it would no longer be possible to develop the avant-garde line, several young composers were forced to emigrate – Pavol Šimai (in 1968 to Sweden), Ladislav Kupkovič (in 1969 to Germany), Peter Faltin (in 1969 to Germany), and Peter Kolman (in 1977 to Austria).

²⁶ See Stadtrucker, I.: *História jedného zvukového pracoviska*. [The History of a Sound Studio.] In: *Slovenská hudba*, 13, 1969, no. 9 – 10, p. 344; Berger, R.: *Esej o elektroakustickej hudbe* [An Essay on Electroacoustic Music] (1987). In: *Rozhlas o slovenská elektroakustická hudba* [Študijný zošit Metodicko-výskumného kabinetu. Čs. rozhlasu.] Bratislava: The Czechoslovak Radio in Bratislava, 1989, pp. 111 – 150.

²⁷ Based on this recording (where Zeljenka reads an excerpt from the *Stravinsky Interview with Robert Craft*, edited in a simple retrograde process, with other sounds and edited orchestral excerpts added), we can establish that the initial études consisted of recording various (musical and non-musical) sounds, texts, and Dadaist exclamations, their simple editing with the tape recorder, and their subsequent montage.

²⁸ The three-CD + LP *Experimental Studio Bratislava Series* project was released on the occasion of the fiftieth anniversary of the establishment of the Experimental Studio of the Czechoslovak Radio in Bratislava (EXS). They consist of historical recordings primarily from the archives of EXS and the Radio and Television of Slovakia (RTVS): CD 1 – *Iná hudba* [Other Music] (SOZA, VD 0011-2, 2015), CD2 – *Nová generácia* [New Generation] (SOZA, VH 0011-2, 2016), CD 3 – *Naši hostia* [Our Guests] (SOZA, 2790-001-2, 2017).

²⁹ The Sound Studio of the Czechoslovak Television was situated on the first floor of the building of the former Tatra Bank. At that time, it had four Sander-Jansen studio tape recorders, a sinusoidal wave generator, and, later, also a ring modulator (made in the State Film in Koliba based on the designs of the Polish musicologist Józef Patkowski). The first list of the technical equipment of the Sound Studio of the Czechoslovak Television was published in Ivan Stadtrucker’s paper presented at the First Seminar of Electronic Music in Plzeň in 1964. See Bláha, M. – Mandík, M.: I. seminár elektronickej hudby v ČSSR [The First Seminar of Electronic Music in the Czechoslovak Socialist Republic]. In: *Slovenská hudba*, 22, 1996, no. 1 – 2, pp. 23 – 24.

³⁰ The original intention was to produce a twenty-minute soundtrack, but only a two-minute étude was born. See Stadtrucker, 1969, p. 345.

gradually led to an end of this then progressive experimental sound studio in Slovakia.³¹

The significance of the Sound Studio of the Czechoslovak Television for avant-garde ambitions lay in learning about the possibilities of electroacoustics in the process of sound production. Although the priority of its productions was film, in this studio the composers had an opportunity to work equally with musical and sound material, both real (concrete) and electrogenic, for the first time. Ultimately, the experience gained by working in the Sound Studio translated also into the orchestral and chamber compositions of the Slovak Musical Avant-garde over the 1960s (in the use of glissandos, canonic repetitions, or reverberation). Although the Sound Studio in fact did not achieve the status of an electroacoustic studio and, after eight years of active work its activities gradually declined, it played an indispensable role in the context of the development of Slovak electroacoustic music. On a professional basis, it provided an opportunity for Slovak composers for their first encounter with the electronic media in the field of musical production and it entrenched electroacoustic music in the sphere of both the dramatic and the documentary art (narrative and documentary films, television productions).³²

3.2 The Experimental Studio of the Czechoslovak Radio

The imaginary baton was handed over to the newly established studio in the Czechoslovak Radio, which significantly dynamized the avant-garde musical developments of the 1960s in Slovakia. Already in 1964, on the initiative of Slovak directors, Triková režia [Trick Direction] was established, whose task was to enhance the artistic intentions of the directors of dramas and deepen their aesthetic effect with electrogenic and concrete sound materials. The Trick Direction had the technical equipment available at the time: several devices manufactured by the Department of Development of the Czechoslovak Radio in Bratislava³³ (including a so-called trick recorder³⁴), a mixing console, a connection panel, and several laboratory generators. Further devices were added later from the Department of Development of the radio and from the Research Institute of the Radio and Television in Prague.³⁵ The year 1965 may be viewed as a turning point in the development of electroacoustic music. In May 1965, the composer Peter Kolman³⁶ was appointed as the dramaturge of the studio and, in June, the studio acquired the official status of an electroacoustic studio and was named the Experimental Studio of the Czechoslovak Radio (EXS).

The Slovak avant-garde composers who familiarized themselves with the tools and technology of electroacoustic music in the Sound Studio found their way to EXS, too. In 1965 – 1969, several compositions were produced in it for the stage and for documentary narratives:

- 1965: Peter Kolman – *Cikády* [Cicadas]; Ladislav Kupkovič – *Všetci, ktorí padajú* [All Who Fall]; Jozef Malovec – *Polotemné pásmo* [Semidark Zone], *Edison*;
- 1966: Peter Kolman – *Facka* [Slap], *Letecká linka* [Airline]; Jozef Malovec – *Bolo to na váš účet* [It Was on Your Account];
- 1967: Jozef Malovec – *Rekonštrukcia básnika* [Reconstruction of a Poet];
- 1968: Jozef Malovec – *Kismet, Splynutie* [Fusion];
- 1969: Peter Kolman – *Generál Federik* [General Frederic];

EXS covered the needs also of the Czechoslovak Television, so even film music was produced in it:

- 1965: Ladislav Kupkovič – *Nie je škola ako škola* [No Two Schools Are the Same], *Pesticídy* [Pesticides]; Jozef Malovec – *Bolo to na váš účet* [It Was on Your Account]; Pavol Šimai – *Každých sedem minút* [Every Seven Minutes], *Zrak* [Sight], *Tatranské kontrasty* [Contrasts in the Tatras];
- 1966: Ladislav Kupkovič – *Autičko cililink* [Ding-a-Ling Car];

In addition, in 1966, Jozef Malovec produced *Hudba k poézii* [Music for Poetry] (released by Supraphon).

Contrary to the Sound Studio, the EXS of the radio focused, besides stage music, on the production of autonomous experimental electroacoustic and concrete compositions right from its inception.

Several composers competed in composing the first autonomous electroacoustic music. Peter Kolman was working on his composition *Moto non perpetuo* (he did not finish it, it remained a two-minute fragment). Miro Bázlik presented a score in the shape of a pyramid to the sound engineers when he visited EXS for the first time. His project was not implemented, however. Ultimately, *Orthogenesis* by Jozef Malovec became the first autonomous Slovak electroacoustic composition.³⁷ In the spring of 1968, Malovec's *Orthogenesis* represented Slovak electroacoustic music with success at the international festival of electronic music in Florence.³⁸

In the 1960s (up to 1970), several representatives of the Slovak musical avant-garde visited EXS to produce autonomous electroacoustic compositions:

- 1966: Jozef Malovec – *Orthogenesis*; Tadeáš Salva – *Vianočné oratórium* [Christmas Oratorio];
- 1968: Jozef Malovec – *Punctum Alfa, Tmel* [Binder] (live electronics); Peter Kolman – *D 68*; Ladislav Kupkovič – *Intermezzo 2*, *Preparovaný text 1* [Prepared Text 1], *Preparovaný text 2* [Prepared Text 2], *Preparovaný text 3* [Prepared Text 3], *Preparovaný text 3 1/2* [Prepared Text 3 1/2], *Collage*, *Vianoce* [Christmas], *Morceau de Genre*, *Etuda* [Étude], *Confessio*, *Les adieux*;

³¹ Because of the lack of sustained interest of ASC in the profiling of the Sound Studio, Berger resigned from his post of art director. Ján Růčka succumbed to a malignant disease at the age of thirty-seven. The structural reorganization separated the audio equipment from the sound engineers, so the influence of Stadtrucker as the head of the department of sound engineers on the development of the technical equipment was secondary. See Stadtrucker, 1996, p. 44.

³² Electroacoustic sound was no longer degraded to the role of background sound or for creating an atmosphere but became a fully-fledged factor that created meaning and enhanced the aesthetic audio image of the overall form. Screenplays already counted with it as a basic dramaturgic supporting and consolidating element.

A list of films and stage productions up to 1969 (including musical studies) which, partly or completely, used electroacoustic music was provided by Stadtrucker in his contribution *História jedného zvukového pracoviska* [The History of a Sound Studio] (in: *Slovenská hudba*, 13, 1969, no. 9 – 10, pp. 348 – 349).

³³ Already at the end of the 1950s, the programme producers of the Czechoslovak Radio felt they were in need of devices for special effects. Therefore, the Development Department of the Czechoslovak Radio in Bratislava, headed by Mikuláš Zima, focused on producing these devices and it made an effect device for producing sound figures based on foreign models. See Janík, P.: *Premeny technického zariadenia Elektroakustického štúdia* [Transformations of the Technical Equipment of the Electroacoustic Studio]. In: *Rozhlas a slovenská elektroakustická hudba*. [Študijný zošit Metodicko-výskumného kabinetu Čs. rozhlasu.] Bratislava: The Czechoslovak Radio, 1989, pp. 173.

³⁴ See Janík, 1989, p. 174; *Elektroakustické intermezzo* [Electroacoustic Intermezzo]. In: *Slovenská hudba*, 22, 1996, no. 1 – 2, p. 50.

³⁵ For the devices and equipment of the studio, see also Čierna, A.: *Elektroakustická hudba na Slovensku* [Electroacoustic Music in Slovakia]. In: *Slovenská hudba*, 22, 1996, no. 1 – 2, pp. 67 – 111; Príloha [Appendix]. In: *Slovenská hudba*, 22, 1996, no. 1 – 2, p. 324.

³⁶ At that time, Peter Kolman was employed as an editor specializing on twentieth-century music in the Main Editorial Office of Music Broadcasting. They were deciding for the position of the dramaturge between him and Jozef Malovec (who was the editor of Hungarian Broadcasting at that time). Although Kolman had already joined EXS as its dramaturge in May 1965, he received his official appointment decree as the Art Director of EXS on 29 May 1967.

³⁷ The first mono version of *Orthogenesis* was created in 1966 based on experience gained by producing soundtracks for film and stage (which the composer carried out in the Sound Studio and in the Trick Direction) and under the influence of the philosophy of Pierre Teilhard de Chardin. It was based on the music prepared for the LP *Moderná svetová básnická tvorba v slovenských prekladoch* [Modern World Poetry in Slovak Translation] (released by Supraphon in its Gramoklub edition, 1967). Its stereophonic version was created a year later and it represented Slovakia at the World Competition of Electronic Music at Dartmouth College in Hanover (USA) where it won the third prize (LP released by Turnabout-Vox). That is why 1967 is usually stated as the year of its origin. In 1968, its quadrasonic (so-called Fiorentini) version was produced for the international festival Maggio Musicale Fiorentino. See Čierna, A.: *Poetika elektroakustických kompozícií Jozefa Malovca* [The Poetry of Jozef Malovec's Electroacoustic Compositions]. In: *Osobnosti slovenskej hudobnej tvorby II. [Personalities of Slovak Music Production II]*. Banská Bystrica: Academy of Arts, 2006, pp. 55 – 56.

³⁸ *Ibidem*, pp. 51 – 63.

- 1969: Roman Berger – *Elégia in memoriam Ján Rúčka* [Elegy in Memoriam Ján Rúčka]; Ivan Parík – *Hommage to William Croft*;
- 1970: Jozef Malovec – *Tabu* [Taboo]; Miro Bázlik – *Aria (Spektrá V.)* [Aria (Spectra V)], *Adieu (Spektrá VI.)* [Adieu (Spectra VI)]³⁹; Peter Kolman – *Ommagio à Gesualdo*; Ladislav Kupkovič – *Citáty I, II* [Quotes I, II]; Ivan Parík – *Variácie na obrazy Miloša Urbáška* [Variations on the Pictures of Miloš Urbásek], *Hudba k vernisáži II* [Music for Vernissage II]; Juraj Pospíšil – *Méditation électronique* Op. 20;

In their electroacoustic compositions, the Slovak avant-garde composers of the given decade pursued various aesthetic and compositional technical ideas. Based on the analysis of the above compositions,⁴⁰ we may establish that after the initial experiments with sound (Ladislav Kupkovič, Ilja Zeljenka, Pavol Šimai), some basic features of the poetry of Slovak electroacoustic music profiled already in the 1960s: a) ties to musical tradition – using quotations, reinterpretation, and transformation of the musical material from the works of the composers of the past used as a model (Ivan Parík, Miroslav Bázlik, Peter Kolman); b) selection of sound materials from the well-known world of sounds – the sound of instruments and human voice (Ivan Parík, Miroslav Bázlik, and others). The sound material was probably selected with the aim of communicativeness (emphasis on the contentual, semantic potential of the utilized means of expression). The communicativeness of these compositions was ensured also by references to the sources of inspiration in their titles. This was affirmed by the success of the first electroacoustic composition, Malovec's *Orthogenesis*, abroad, as well as by the other presentations of Slovak compositions at concerts and festivals of contemporary music.

4 Conclusion

In Slovak music, the 1960s were marked by the emergence of a young generation of composers with an avant-garde orientation, a generation that introduced the necessary innovative momentums to Slovak music and radically dynamized the development of music in the course of a single decade. The generation of avant-garde composers did not appear as a stylistic monolith but was characterized by the diversification of specific individual stylistic poetics. These manifested themselves also in electroacoustic music, which acted as a prominent dynamizing factor in the development of music in the given period. The subsequent decade, the 1970s, was already marked by "normalization". The unconventional ensemble Hudba dneška [Today's Music] was dissolved, the publishing of the *Slovenská hudba* [Slovak Music] monthly was suspended, the membership of several avant-garde composers in the Association of Slovak Composers was cancelled (which meant they lost funding for composing and their compositions were banned), and the activities of EXS were restricted. Although the subsequent years did not favour the further development of the avant-garde tendencies of the 1960s, the indicated development could no longer be halted and the qualitative achievements of the Slovak musical avant-garde of the 1960s could not be completely negated.

Literature:

1. Godár, V.: Slovenská hudba a normalizácia [Slovak Music and Normalization]. In: *Slovenská hudba*, 22, 1996, no. 1 – 2, pp. 112 – 120.
2. Chalupka, E.: Vývoj hudby po roku 1945 [The Development of Music after 1945]. In: Elschek, O. [ed.]: *Dejiny slovenskej hudby* [History of Slovak Music]. SAV – ASCO Art & Science, Bratislava, 1996, pp. 273 – 329;
3. Chalupka, E.: *Slovenská hudobná avantgarda* [The Slovak Musical Avant-Garde]. Bratislava: Faculty of Arts of Comenius University, 2011. 672 pp.
4. Chalupka, E.: *Generačné a štýlové konfrontácie : Sprivodca slovenskou hudbou 20. storočia II (1951 – 2000)* [Generational and Stylistic Confrontations: A Guide to Twentieth-Century Slovak Music II (1951 – 2000)]. Bratislava: Comenius University in Bratislava, 2018. 879 pp.
5. Burlas, L.: Myšlienky o vývine národnej hudby [Thoughts on the Development of National Music]. In: *Slovenská hudba* 1, 1957, no. 2, pp. 54 – 61.
6. Kardoš, D.: Rozvoj slovenskej hudobnej tvorby za posledných 10 rokov [The Development of Slovak Composition For the Past 10 Years]. In: *Slovenská hudba*, 3, 1959, no. 3, p. 97.
7. Berger, R.: *Esej o elektroakustickej hudbe* [An Essay on Electroacoustic Music] (1987). In: *Rozhlas a slovenská elektroakustická hudba* [Študijný zošit Metodicko-výskumného kabinetu Čs. rozhlasu.] Bratislava: Czechoslovak Radio, 1989. pp. 111 – 150.
8. Stadtrucker, I.: História jedného zvukového pracoviska. [The History of a Sound Studio.] In: *Slovenská hudba*, 13, 1969, nos. 9 – 10, p. 344.
9. Bláha, M. – Mandík, M.: I. seminár elektronickej hudby v ČSSR [The First Seminar of Electronic Music in the Czechoslovak Socialist Republic]. In: *Slovenská hudba*, 22, 1996, no. 1 – 2, pp. 23 – 24.
10. Janík, P.: Premeny technického zariadenia Elektroakustického štúdia [Transformations of the Technical Equipment of the Electroacoustic Studio]. In: *Rozhlas a slovenská elektroakustická hudba*. [Študijný zošit Metodicko-výskumného kabinetu Čs. rozhlasu. / Study Brochure of the Methodological Research Department CzS. Radio in Bratislava.] Bratislava: The Czechoslovak Radio, 1989. pp. 173.
11. Janík, P.: Elektroakustické intermezzo [Electroacoustic Intermezzo]. In: *Slovenská hudba*, 22, 1996, nos. 1 – 2, p. 50.
12. Čierna, A.: Elektroakustická hudba na Slovensku. Príloha [Electroacoustic Music in Slovakia. Appendix]. In: *Slovenská hudba*, 22, 1996, nos. 1 – 2, pp. 67 – 111, pp. 307 – 324.
13. Čierna, A.: Poetika elektroakustických kompozícií Jozefa Malovca [The Poetry of Jozef Malovec's Electroacoustic Compositions]. In: *Osobnosti slovenskej hudobnej tvorby II* [Personalities of Slovak Music Production II]. Banská Bystrica: Akadémia umení, 2006, pp. 51 – 63.
14. Čierna, A.: *Elektroakustická hudba na Slovensku a možnosti jej pedagogickej interpretácie* [Electroacoustic Music in Slovakia and Ways of its Pedagogical Interpretation]. [Dissertation]. Nitra: Constantine the Philosopher University, 2010. 220 pp.
15. *Slovenská hudba* [Slovak Music], Vol. 1 – 15, 1957 – 1971.

Primary Paper Section: A

Secondary Paper Section: AB, AJ, AL

³⁹ Originally independent electroacoustic compositions based on Johann Sebastian Bach's *Well-Tempered Clavier I*, which the composer later combined into a single cycle called *Spektrá. Metamorfózy a komentáre k I. dielu Dobre temperovaného klavíra J. S. Bacha* [Spectra. Metamorphoses and Commentaries to Book I of Johann Sebastian Bach's *Well-Tempered Clavier*] (1970 – 1974). The cycle consists of six movements: 1. *Pieta* [Pieta] (Spektrá I. [Spectra I], 1972), 2. *Immersion* [Pieta] (Spektrá II. [Spectra II], 1974), 3. *Apokalypsa* [Apocalypse] (Spektrá III. [Spectra III], 1971), 4. *Concertino* (Spektrá IV. [Spectra IV], 1972), 5. *Aria* (Spektrá V. [Spectra V], 1970), and 6. *Adieu* (Spektrá VI. [Spectra VI], 1970). When performed, each movement of the cycle was preceded by Bach's *Prelude and Fugue: No. 4 in C# Minor, No. 8 in D# Minor, No. 12 in F Minor, No. 15 in G Major, No. 18 in A Minor, and No. 24 in B Minor*.

⁴⁰ Tectonic analyses were performed based on the acousmatic approach and the subsequent perception score. See Čierna, A.: *Elektroakustická hudba na Slovensku a možnosti jej pedagogickej interpretácie* [Electroacoustic Music in Slovakia and Ways of its Pedagogical Interpretation]. [Dissertation]. Nitra: Constantine the Philosopher University, 2010, 220 pp. Also, Čierna, A., 1996, pp. 67 – 111.

SYMPTOMS OF EATING DISORDERS IN YOUNG WOMEN WITH AND WITHOUT SELF-HARMING BEHAVIOUR

^aDOMINIKA DOKTOROVA, ^bSLAVKA DEMUTHOVA

University of Ss. Cyril and Methodius in Trnava, Nam. J. Herdu 2, 917 01 Trnava, Slovak republic
 email: ^adominika.doktorova@ucm.sk,
^bslavka.demuthova@ucm.sk

This work was supported by the Slovak Research and Development Agency under contract No. APVV-17-0123.

Abstract: The paper addresses self-harming behaviour and the prevalence of eating disorders in females in adolescence and young adulthood. It aims to identify the difference between the total score and the score of the individual symptoms of eating disorders in young women with and without self-harming behaviour. The study sample consists of 60 women (ED) aged 15 – 26 (mean age = 18.4 years) who suffer from an eating disorder, of which N = 30 (50%) exhibit self-harming behaviour. The participants were tested using a modified SHI (Self-Harm Inventory) questionnaire to identify SH, and the EDI-2 (Eating Disorders Inventory) to establish the total score and individual symptoms of ED. SH participants with ED scored statistically significantly higher in six subscales and the total EDI-2 score than non-SH participants with ED (sig_s 0.000). The results of the data analysis of the study sample clearly demonstrate that those participants who SH have more pronounced symptomatology of ED.

Keywords: eating disorders, self-harm, symptoms, differences, women.

1 Introduction

Eating disorders (ED) are serious mental illnesses with characteristic signs and symptoms. One of the symptoms is an excessive desire to reach, and subsequently maintain, a low body weight through various detox mechanisms such as, vomiting, repulsion and/or excessive exercise (Morris & Twaddle, 2007; Dittmer, Jacobi, & Voderholzer, 2018). An inability to achieve the target weight then results in depressive tendencies, anxiety, feelings of worthlessness or a fear of losing control and attractiveness (Sharma, 2018; Morrison, 2014). In bulimia nervosa (BN), feelings of disappointment that stem from binge eating lead to activities that aim to prevent an increase in body weight (Fialova & Krch, 2012), e.g. through vomiting, taking diuretics or laxatives (Mehler & Rylander, 2015). The majority of ED cases occur in the adolescent population (Fialova & Krch, 2012) and among young adults (the highest prevalence is at an age of approximately 21 – Ward, Rodriguez, Wright, Austin, & Long 2019), for whom it is characteristic (inter alia) to find an obsessive need for external perfection.

Self-harm (SH) has no exact definition, which leads to complications in comparing related studies. One reason for this might be that this type of behaviour has not been recognised as a clinical syndrome (Kriegelova, 2008) and as such, its definition and diagnostics are not unified. Generally, SH is defined as behaviour that leads to intentional self-harm and self-destruction (Favazza, 1999), but definitions differ in what is considered to be the aim of this harm. The concept of Non-Suicidal Self-Injury (NSSI), in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) only takes into consideration those behaviours, which directly and visibly harm the bodily tissues of an individual (burning, cutting, hitting oneself etc.) (DSM-5, 2013). On the other hand, the International Statistical Classification of Diseases and Related Health Problems, tenth revision (ICD-10) also includes indirect and hidden forms of self-harm in the categories of Intentional Self-Harm (categories: X60 – X84) (abuse of medicines, alcohol abuse, hurting oneself by falling/jumping etc.) (ICD-10, 2016), and within other approaches, SH further includes mental self-harm (torturing oneself with self-defeating thoughts, engaging in emotionally abusive relationships etc.) (Sansone & Sansone, 2010).

Thus, SH, if defined broadly, may include behaviour with symptoms that overlap those of ED. Intentional starvation and the abuse of laxatives aiming to harm oneself are one of the indirect physical forms of SH (Demuth & Demuthova, 2019).

Other parallels between SH and ED appear in terms of control. SH tends to be a maladaptive coping strategy, a reaction to a mishandled situation, and the SH individuals often report that only through SH do they feel in control of what they are doing. It helps them to compensate for the loss of control over those aspects that are producing their psychological distress (Demuthova & Demuth, 2019, Petermann, Nitkowski, 2015). In the same way, the obsession over body weight and weight control found in ED is frequently an attempt to compensate for an inability to regulate or to control the life situation of the individual (Froreich, Vartanian, Grisham, & Touyz, 2016). Both ED and SH help in emotion regulation and thus are used as coping mechanisms (Smithuis et al., 2018). Within the context of the composition of the research sample, ventilation of emotions is specifically important, as it is typically a female maladaptive coping strategy (Mickova 2017).

In addition to the parallels in the symptoms of SH and ED, it is important to point out the differences, bearing in mind that they are two separate clinical diagnoses (although SH is not a clearly defined nosological unit). The key difference is motivation – for ED, the dominant motivation is to reach and maintain a desired weight, in the case of SH, starvation, laxative abuse and other types of behaviour (that also occur in ED) are only tools used to hurt oneself and cause pain (physical or mental), and their impact on body weight is not the primary goal. Specific studies that have observed the mutual interactions between these two diagnoses have revealed interesting links. Apparently, the prevalence of SH behaviour varies dependent on the type of ED (Claes, Vanderycken, & Vertommen, 2001, 2003, Favaro & Santanastaso, 2002, Peebles, Wilson, & Lock, 2011); the prevalence of SH is typically higher among individuals with anorexia nervosa (AN) (Claes, Vanderycken, & Vertommen, 2001), and patients with ED who SH have a statistically significant longer history of treatment for their ED than those who do not (Smithuis et al., 2018) etc.

2 Objective

Considering the links that exist between ED and SH in terms of their co-morbidity, the mechanisms by which they affect mental health etc., it is important that for effective differential diagnostics, intervention and treatment, we clarify the areas and manner of their mutual interactions. The objective of our study is to detect the differences in the total score as well as the score of the individual symptoms of ED in SH and non-SH participants. In consideration of the prior research in this area (Muehlenkamt et al., 2009; Claes, Nederkoorn, Vandereycken, Guerrieri, & Vertommen, 2006; Claes, Vanderycken, & Vertommen, 2001, 2003; Favaro & Santanastaso, 2002; Fialová & Krch, 2012; Peebles, Wilson, & Lock, 2011; Paul et al., 2002), we formulated the following hypothesis and research question:

H: There are statistically significant differences in the total ED score between self-harming and non-self-harming participants.

RQ: Are there any statistically significant differences in the individual ED symptoms between self-harming and non-self-harming participants?

3 Methods

3.1 Participants and Procedure

The study sample was formed through intentional selection. The criteria for inclusion in the study were sex (female), age (15 – 29) and that the individual was receiving outpatient treatment as a consequence of a diagnosis of an ED. The patients completed a questionnaire which aimed to establish the presence of SH. From the results 30 self-harming women (SH group) and 30 non-self-harming women (non-SH group) were

selected at random. The groups were comparable with regard to age, gender, diagnoses, location and profession. Table 1 shows the basic data of these two groups.

The mean age of the study sample was 18.4. The study sample included patients suffering from anorexia nervosa (65%) and bulimia nervosa (35%).

Table 1: Basic characteristics of SH and non-SH group

	SH group	Non-SH group
Age (mean)	15 – 26 (18.07)	15 – 25 (17.93)
Diagnosis (%)	AN (60%) BN (40%)	AN (70%) BN (30%)
Region	Western and central Slovakia	Eastern and central Slovakia
Occupation	Student or young graduate job	Student

The questionnaire battery was individually administered to the participants after receiving consent (or the consent of their guardian), and the data collection was standardised and anonymous. The participants were free to withdraw from the research project at any time.

3.2 Measures and Statistical Analysis

A modified Self-Harm Inventory (SHI), as published by the authors, R. A. Sansone & L. A. Sansone (2010), was used in order to identify SH behaviour in the study group. The translation, back-translation and translation quality evaluation were provided by independent evaluators. The Slovak version of the questionnaire includes 20 forms of SH (for the list, see Demuthova & Demuth, 2020). SHI is a self-rating questionnaire, in which the respondents report the frequency of occurrence of a specific SH behaviour on a 4-degree scale (from “never” to “often”). A previous study (see e.g. Demuthova & Doktorova, 2018) has confirmed the relatively high-quality internal consistency of this methodology (Cronbach’s $\alpha = 0.809$).

The presence of ED symptoms, their extent and the total ED score were measured using the Eating Disorder Inventory (EDI-2). The second version of the questionnaire was used for this study. Unlike the original version (Garner, Olmstead & Polivy, 1983), it includes both the original eight scales of Body Dissatisfaction (BD), Bulimia (B), Drive for Thinness (DT), Ineffectiveness (I), Interpersonal Distrust (ID), Interoceptive Awareness (IA), Perfectionism (P) and Maturity Fears (MF), plus three others: Asceticism (A), Impulse Regulation (IR) and Social Insecurity (SI) (Garner, 1991). EDI-2 is a self-assessment checklist with questions that are answered from a choice on a 6-point scale (ranging from “always” to “never”). The score for each sub-scale can be calculated along with the overall EDI-2 score. The translation, back-translation and translation quality evaluation were conducted by independent evaluators.

The data was processed using the SPSS 22 statistical analysis software; the statistical significance threshold for each data analysis was set to 0.05. Considering the fact that the questionnaires are not standardised to our population, it was necessary to carry out reliability tests using Cronbach’s alpha test. In the SHI questionnaire, the internal consistency was $\alpha = 0.85$; the individual EDI-2 scales varied from 0.769 to 0.869, which corresponds to a good level of reliability (Rojkova, 2019). In order to select the appropriate tests to be used to verify the hypothesis and answer the research question, it was necessary to test for a normal value distribution in the observed variables. The significance values from the Shapiro-Wilk test were ≤ 0.05 ; hence a non-parametric Mann-Whitney U test was used for the statistical analyses.

4 Results

The Mann-Whitney U test for two independent data sets, testing the hypothesis:

“There are statistically significant differences in the total ED score between self-harming and non-self-harming participants”
The test confirmed the formulated assumption. H1 is proven based on the presence of statistically significant differences (see Table 2) in the total EDI-2 score ($U = 145.500$; $Z = -4.509$; Sig. 0.000) between the SH and non-SH group of participants.

Table 2: Comparison of the total EDI-2 score in the SH and non-SH group

	Group	N	Mean rank	Mann-Whitney U test
EDI-2 score	SH	30	40.65	$U = 145.500$ $Z = -4.509$ Sig. = 0.000***
	Non-SH	30	20.35	
	Total	60		

*** $p \leq 0.001$

For the research question:

“Are there any statistically significant differences between self-harming and non-self-harming participants in the individual ED symptoms?”

statistically significant differences were identified in nine EDI-2 subscales: BD, DT, I, ID, IA, MF, A, IR and SI (see Table 3).

Table 3: Comparison of the scores of individual symptoms from EDI-2 in the SH and non-SH group

EDI	Group	N	Mean rank	Mann-Whitney U test	Asymp. sig. (2-tailed)
BD	SH	30	41.18	$U = 129.500$	0.000***
	Non-SH	30	19.82	$Z = -4.751$	
B	SH	30	32.38	$U = 393.500$	0.402
	Non-SH	30	28.38	$Z = -0.839$	
DT	SH	30	41.73	$U = 145.500$	0.000***
	Non-SH	30	19.27	$Z = -4.509$	
I	SH	30	38.68	$U = 204.500$	0.000***
	Non-SH	30	22.32	$Z = -3.641$	
ID	SH	30	42.15	$U = 100.000$	0.000***
	Non-SH	30	18.85	$Z = -5.176$	
IA	SH	30	40.70	$U = 144.000$	0.000***
	Non-SH	30	20.30	$Z = -4.563$	
P	SH	30	29.38	$U = 416.000$	0.619
	Non-SH	30	31.62	$Z = -0.498$	
MF	SH	30	36.93	$U = 257.000$	0,004**
	Non-SH	30	24.07	$Z = -2.866$	
A	SH	30	44.65	$U = 25.500$	0.000***
	Non-SH	30	16.35	$Z = -6.289$	
IR	SH	30	25.71	$U = 145.500$	0.000***
	Non-SH	30	40.84	$Z = -4.509$	
SI	SH	30	26.33	$U = 218,500$	0,001***
	Non-SH	30	39.50	$Z = -3.402$	

Note: BD = Body Dissatisfaction; B = Bulimia; DT = Drive for Thinness; I = Ineffectiveness; ID = Interpersonal Distrust; IA = Interoceptive Awareness; P = Perfectionism; MF = Maturity Fears; A = Asceticism; IR = Impulse Regulation; Si = Social Insecurity

** $p \leq 0.005$

*** $p \leq 0.001$

For most of the EDI-2 symptoms observed, the SH group scored higher than the non-SH group, even for the B subscale, where the cross-group differences were not statistically significant. The only exceptions were in three subscales – IR and SI (with a statistically significant difference between the

groups) and P (without a statistically significant difference), in which the SH group scored lower than the non-SH group.

4 Discussion

ED are complex mental disorders, which have an adverse impact on the mental, somatic, and social wellbeing of the affected person (Boyd et al., 2017). Moreover, they often co-occur with other mental disorders; in the context of comorbidity with AN, DSM-5 lists bipolar disorder, depression, anxiety disorders, obsessive-compulsive disorder (in the restrictive type) and addictive substance abuse (in the case of purging). People with BN tend to suffer from more than one mental disorder, often from several and the co-morbidity is not restricted to a specific subgroup but appears over the whole scale of mental disorders (DSM-5, 2013).

Several studies (Peebles, Wilson, & Lock, 2011; Muehlenkamp et al., 2009) have suggested there might be a link between ED and SH – for instance, Claes, Nederkoorn, Vandereycken, Guerrieri, & Vertommen (2006) reported that approximately one third of ED sufferers directly or indirectly self-harm several times a month. Our study, focusing on women diagnosed with an ED, revealed a more serious prevalence of this type of disorder (a higher total score and higher scores on the individual subscales of the Eating Disorder Inventory) in the group that reported SH. It is possible that SH individuals are used to discomfort, which they trigger through various activities that cause SH, and thus are willing to go further and hence their ED is more severe than in non-SH individuals. A more accurate interpretation of our findings is offered by a deeper insight into the individual ED symptoms where the SH group scored statistically significantly higher. These included BD, DT, I, ID, IA, MF and A.

Body Dissatisfaction (BD) is an indicator of dissatisfaction with one's own body, with one's physical appearance, and in EDI, it is characterised by items such as: "I think my buttocks are too large", "I think that my stomach is too big", etc. Considering that we do not know the causal relationship between SH and BD, the greater extent of this dissatisfaction in the SH group may be interpreted in several ways. Self-harm of one's own body decreases its aesthetic value (wounds, scars. . .), which is why participants with SH may view their bodies more critically than the non-SH ED participants. A low level of satisfaction with one's own body may therefore be a consequence of self-harming behaviour (Benzel, 2019). However, an inverse link is also plausible – participants with high levels of BD do not appreciate their bodies and consequently have no boundaries when it comes to damaging it. Participants with a higher level of body satisfaction would probably be less willing to "mutilate" their bodies. In this context, it might be beneficial to observe the differences in the forms of SH – it is possible that participants with higher levels of body satisfaction prefer indirect and less visible forms of SH, or even possibly mental forms of SH. Future research is needed to analyse the causality of the links outlined above in order to reveal their true nature. But it is also highly likely that there is no causal correlation between ED and SH and they only co-occur in parallel as comorbid diseases and mutually support each other through a tendency to indulge in high-risk behaviours (whether that be in the form of ED or SH).

We may also make similar assumptions in regard to the significant difference found in the DT (Drive for Thinness) subscale between the SH and non-SH groups. Drive for Thinness directly correlates with Body Dissatisfaction (Morisson, 2014) – the pathological forms of weight loss are a consequence of dissatisfaction with one's own body. However, the problem is that radical weight loss normally does not lead to an increase in body satisfaction. On the other hand, muscle mass and tissues lose flexibility, the WHR ratio, considered a measure of attractiveness, (its optimal value is 0.7 – Platek & Singh, 2010) increases, and the body loses its female curves. For this reason, radical weight loss does not result in a higher level of satisfaction with one's own body which (in a vicious

circle) triggers a further increase in weight loss activities or excessive exercise. A possible explanation for the higher level of DT in SH adolescents and young women (as opposed to the participants without any SH behaviour) may be similar to that in the case of BD – SH behaviour may, for example, move the limit of DT, since the SH individual is more able to bear the side effects of DT as they are already used to greater levels of discomfort from their SH activities; hence, their ED activity may also be more intense. In a similar way, certain symptoms of SH (intentional starvation or excessive exercise) may be preferred by participants with ED and consequently reinforce the extent of the ED.

The higher Ineffectiveness (I) score in the SH group may be interpreted as the result of two mechanisms. The first is that self-harming is the result of an ineffective strategy used to cope with mental burdens and is a maladaptive mechanism (Demuthova & Spasovski, 2020). Thus, it may be assumed that it occurs in individuals who are incapable of dealing with their difficulties in an effective and adaptive manner. For this reason, the I score may be higher in ED participants with SH. Another possible interpretation is that SH behaviour leads to severe deterioration in the state of health (both mental and physical), which affects the individual's performance (mental and physical) as well as effectiveness, which is ultimately reflected in a higher level of I.

Increased ID in SH participants is probably the result of either a basal mind-set with a lack of trust towards others, which motivates them to seek solutions to their problems through SH (and not, for example, by reaching out to others), or it may be a consequence of negative experiences that SH participants have had with the reactions of others. SH behaviour is often misunderstood and this results in a negative reaction from others and is wrongly interpreted as an effort to draw attention to oneself (Klonsky, Victor, & Saffer, 2014). Such a reaction from those around them may lead to an increase in ID, which was found in our sample of participants with ED.

Interoceptive Awareness (IA) represents the ability to perceive and integrate visceral signals relating to bodily states (e.g. hunger, intestinal tension, heartbeat, respiration, pain...) (Khalsa & Lapidus 2016). The existence and subsequent interpretation of these sensations provide a sense of one's physical self and play a crucial role in emotional processing to help guide one's behaviour (Craig, 2002). This subscale is considered highly sensitive with regard to ED; interoceptive issues, out of all EDI subscales, are deemed to be the best predictor of ED (Clausen, Roseninge, Friborg, & Rokkedal, 2011). Previous studies have also found that interoceptive awareness, along with three specific eating disorder subscales, allows discrimination between patients with eating disorder and psychiatric issues (Nevonen, Clinton, & Norring, 2006; Schoemaker, Verbraak, Breteler, & van der Staak, 1997). The IA of individuals with ED is dysfunctional on both levels – perceptual and behavioural. Case reports emphasise vague feelings of fullness or the failure to recognise bodily states as key characteristics reported by ED patients (Khalsa & Lapidus, 2016). On a behavioural level, they may, for example, ignore the feeling of hunger (anorexia) or fullness (bulimia), fatigue and exhaustion (excessive exercise). The link with SH in this regard is clear – SH individuals also ignore the warning signs (pain) from their bodies while practising self-harm, in the clinical picture, there are often deficiencies in understanding of emotions and in emotion regulation (Andover & Morris, 2014), overall the relationship with one's own body is damaged (Black, Garratt, Beccaria, Mildred, & Kwan, 2019). A higher level of IA in SH participants is therefore understandable.

Maturity Fears (MF) are considered to be a major (subconscious) element in the aetiology of ED (Holland, Bodell, & Keel, 2013). However, they are not normally linked to SH; they do not occur as key characteristics in the symptomatology of SH. The studies hitherto that have observed the correlation between SH and ED have failed to demonstrate that the occurrence of MF with the addition of SH would

change significantly (see e.g. Gomez-Exposito et al., 2016; Claes et al., 2018). However, our study showed that ED patients with SH had significantly worse MF symptoms than those without SH. Hence, it is possible in these cases that SH is a part of the symptomatology of a broader problem in adolescence, where both SH and ED may occur. Increased complications may result in a higher prevalence of both variables, which could explain the higher MF in individuals with SH. Further research is needed which might reveal the specificities in the study sample and provide possible explanations for the higher prevalence of MF in SH individuals.

The final ED subscale that had a statistically significantly higher prevalence in the SH group was Asceticism (A). According to Garner (2020) Asceticism reflects a tendency for self-discipline, self-denial, self-restraint, self-sacrifice and control of bodily urges. The tendencies to suppress one's own needs and to be too hard on oneself are typical traits of SH individuals, thus the higher level of A in this group is understandable.

Yet, the SH group of participants with ED also statistically significantly differed from the non-SH group in other EDI-2 subscales, with lower scores. These subscales were Impulse Regulation (IR) and Social Insecurity (SI). Impulsivity is an important construct in non-suicidal self-injury (Glenn & Klonsky, 2010). The correlation between impulsivity and SH occurs on two levels: on one hand, individuals who have difficulty controlling their impulses when distressed may select NSSI as a strategy to reduce the negative affect (Allen, Fox, Schatten, & Hooley, 2019), but on the other hand, it is also true that a lower level of impulse control in SH individuals leads to more frequent SH behaviour. In this context (based on a meta-analysis of 4,496 scientific articles), J. Lockwood, D. Daley, E. Townsend, & K. Sayal (2017) reached the interesting conclusion that mood-based impulsivity is related to the initiation of self-harm, while the cognitive facets of impulsivity are associated with the maintenance of self-harm.

Social Insecurity (SI) is also a crucial component in the ED symptomatology (Garner, 1991). Its presence among patients may be interpreted in several ways. Firstly, the broad range of ED behaviours (vomiting, excessive exercise, hiding food, purging...) require intentional isolation and that such behaviour should be hidden from others; secondly, the reactions of others to ED behaviour provokes the patients' tendency to isolate themselves; however, it was also shown that there are even more basal mechanisms based on atypical brain activity (disturbed orbitofrontal cortex activity), which underlie the lack of insight and social isolation that is characteristic of patients with ED (Katayama et al., 2014). The increased level of SI in ED is therefore in line with the characteristics and clinical picture of this disorder. It is not quite clear why the presence of SH in participants with ED decreases SI to a statistically significant degree. Based on the prevalence of SH in the observed population (studies report up to 45% – Demuthova & Demuth, 2020), it may be assumed that such wide-spread behaviour may be a source of social support, especially among peers. Counter-intuitively, SH may be a platform for social contact and to make an individual more acceptable to others, unlike "pure" ED. This interpretation is partially supported by studies that suggest that social aspects have a major impact in triggering and maintaining SH behaviour (see e.g. Jacob, Evans, & Scourfield, 2017; Memon, Sharma, Mohite, & Jain, 2018).

4 Conclusion

The results of the study reveal that the group of participants with ED and SH behaviours exhibited significantly stronger ED symptomatology in virtually all of the observed EDI-2 subscales, as well as in the total score. The most obvious interpretation of these results would be the synergic effect of these two clinical conditions, not excluding their mutual causality, which would have to be verified in future research.

Acknowledgement

This work was supported by the Slovak Research and Development Agency under contract No. APVV-17-0123.

Declaration of a Conflict of Interest

The authors declare there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Literature:

- Allen, K., Fox, K. R., Schatten, H. T., & Hooley, J. M. (2019). Frequency of nonsuicidal self-injury is associated with impulsive decision-making during criticism. *Psychiatry Research*, 271, 68–75.
- Andover, M. S., & Morris, B. W. (2014). Expanding and clarifying the role of emotion regulation in nonsuicidal self-injury. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, 59 (11), 569–575.
- Benzel, S. (2019). Selbstverletzende Handlungen in der Adoleszenz. [Self-injurious acts in adolescence]. In S. Benzel (Ed.): *Die Bedeutung des Körpers bei Selbstverletzungen junger Frauen. Adoleszenzforschung (Zur Theorie und Empirie der Jugend aus transdisziplinärer Perspektive)*. [The role of the body in self-harm in young women. Adolescence research (On the theory and empiricism of youth from a transdisciplinary perspective)]. Wiesbaden: Springer, doi: 10.1007/978-3-658-27947-9_2.
- Black, E. B., Garratt, M., Beccaria, G., Mildred, H., & Kwan, M. (2019). Body image as a predictor of nonsuicidal self-injury in women: A longitudinal study. *Comprehensive Psychiatry*, 88, 83–89.
- Boyd, H. K., Kass, A. E., Accurso, E. C., Goldschmidt, A. B., Wildes, J. E., & Grange, D. L. (2017). Relationships between desired weight and eating disorder pathology in youth. *International Journal of Eating Disorders*, 50 (8), 963–969.
- Claes, L., Nederkoorn, C., Vandereycken, W., Guerrieri, R., & Vertommen, H. (2006). Impulsiveness and lack of inhibitory control in eating disorders. *Eating Behaviors*, 7 (3), 196–203.
- Claes, L., Turner, B., Dierckx, E., Luyckx, K., Verschueren, M., & Schoevaerts, K. (2018). Different clinical presentations in Eating Disorder patients with Non-Suicidal Self-Injury based on the co-occurrence of Borderline Personality Disorder. *Psychologica Belgica*, 58 (1), 243–255.
- Claes, L., Vandereycken, W., & Vertommen, H. (2001). Self-injurious behaviours in eating-disordered patients. *Eating Behaviors*, 2 (3), 263–272.
- Claes, L., Vandereycken, W., & Vertommen, H. (2003). Eating disordered patients with and without self-injurious behaviours: a comparison of psychopathological features. *European Eating Disorders Review*, 11 (5), 379–396.
- Clausen, L., Rosenvinge, J. H., Friborg, O., & Rokkedal, K. (2011). Validating the Eating Disorder Inventory-3 (EDI-3): A Comparison Between 561 Female Eating Disorders Patients and 878 Females from the General Population. *Journal of Psychopathology and Behavioral Assessment*, 33 (1), 101–110.
- Craig, A. D. (2002). How do you feel? Interoception: The sense of the physiological condition of the body. *Nature reviews. Neuroscience*, 3 (8), 655–666.
- Demuth, A. & Demuthova, S. (2019). *Forms of Deliberate Self-Harm and their prevalence in adolescence*. In *International Conference on Research in Psychology*. London: Diamond Scientific Publication, 2–38.
- Demuthova, S., & Demuth, A. (2019). The prevalence and most frequent forms of self-harm in adolescents. In *International Conference on Research in Psychology*. London: Diamond Scientific Publication, 39–51.
- Demuthova, S., & Demuth, A. (2020). Self-harm in adolescence as maladaptive coping. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 1 (2), Sup.1, 37–47.
- Demuthova, S., & Doktorova, D. (2018). Interpohlavné rozdiely v prevalencii jednotlivých foriem sebapoškodzovania u adolescentov. [Gender differences in the prevalence of individual forms of self-harm in adolescents] In A. Baranovska

- (Ed.): *Kondášove dni 2018*. Trnava: Katedra psychológie FF UCM v Trnave, 19–32.
16. Demuthova, S., & Spasovski, O. (2020). The analysis of drop-out in the potential diagnostic systems for self-harm in the adolescent population. *Ad Alta. Journal of Interdisciplinary Research*, *10* (2), In Editum.
17. Dittmer, N., Jacobi, C., & Voderholzer, U. (2018). Compulsive exercise in eating disorders: proposal for a definition and a clinical assessment. *Journal of Eating Disorders*, *6*, 42, doi: 10.1186/s40337-018-0219-x.
18. DSM-5 (2013). *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, DC: American Psychiatric Publishing.
19. Favaro, A., & Santonastaso, P. (2002). The spectrum of self-injurious behavior in Eating Disorders. *Eating Disorders*, *10* (3), 215–225.
20. Favazza, A. R., & Rosenthal, R. J. (1990). Varieties of pathological self-mutilation. *Behavioural Neurology*, *3* (2), 77–85.
21. Fialová, L., & Krch, F. D. (2012). *Pojetí vlastního těla – zdraví, zdatnost, vzhled*. [The concept of one's own body - health, fitness, appearance]. Praha: Karolinum.
22. Frorreich, F. V., Vartanian, L. R., Grisham, J. R., & Touyz, S. W. (2016). Dimensions of control and their relation to disordered eating behaviours and obsessive-compulsive symptoms. *Journal of Eating Disorders*, *4* (14), doi: 10.1186/s40337-016-0104-4.
23. Garner, D. M. (1991). *Eating disorder inventory-2: professional manual*. Odessa: Psychological Assessment Resources.
24. Garner, D. M. (2020). *Eating Disorder Inventory-3 (EDI-3) scale descriptions*. [Online]. Psychological Assessment Resources. (2020-09-28). Retrieved from URL: <https://toledo center.com/wp-content/uploads/2015/10/EDI-3-Scale.pdf>.
25. Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, *2* (2), 15–34.
26. Glenn, C. R. & Klonsky, E. D. (2010). A multimethod analysis of impulsivity in nonsuicidal self-injury. *Personality Disorders*, *1* (1), 67–75.
27. Gomez-Exposito, A., Wolz, I., Fagundo, A. B., Granero, R., Steward, T., Jiménez-Murcia, S., ... & Fernández-Aranda, F. (2016). Correlates of Non-Suicidal Self-Injury and suicide attempts in Bulimic Spectrum Disorders. *Frontiers in Psychology*, *7*, 1244, doi: 10.3389/fpsyg.2016.01244.
28. Holland, L. A., Bodell, L. P., & Keel, P. K. (2013). Psychological factors predict eating disorder onset and maintenance at 10-year follow-up. *European Eating Disorders Review: The Journal of the Eating Disorders Association*, *21* (5), 405–410.
29. Jacob, N., Evans, R., & Scourfield, J. (2017). The influence of online images on self-harm: A qualitative study of young people aged 16–24. *Journal of Adolescence*, *60*, 140–147.
30. Katayama, H., Kohmura, K., Tanaka, S., Imaeda, M., Kawano, N., Noda, Y. ... Ozaki, N. (2014). Social insecurity in relation to orbitofrontal activity in patients with eating disorders: a near-infrared spectroscopy study. *BMC Psychiatry*, *14*, 173.
31. Khalsa, S. S., & Lapidus, R. C. (2016). Can interoception improve the pragmatic search for biomarkers in psychiatry? *Frontiers in Psychiatry*, *7*, 121, doi: 10.3389/fpsyg.2016.00121.
32. Klonsky, E. D., Victor, S. E., & Saffer, B. Y. (2014). Nonsuicidal self-injury: what we know, and what we need to know. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, *59* (11), 565–568.
33. Kriegelova, M. (2008). *Záměrné sebapoškodzování v dětství a adolescenci*. [Intentional self-harm in childhood and adolescence]. Praha: Grada Publishing, 2008.
34. Lockwood, J., Daley, D., Townsend, E., & Sayal, K. (2017). Impulsivity and self-harm in adolescence: a systematic review. *European Child & Adolescent Psychiatry*, *26* (4), 387–402.
35. Mehler, P. S., & Rylander, M. (2015). Bulimia Nervosa - medical complications. *Journal of Eating Disorders*, *3*, 12, doi: 10.1186/s40337-015-0044-4.
36. Memon, A. M., Sharma, S. G., Mohite, S. S., & Jain, S. (2018). The role of online social networking on deliberate self-harm and suicidality in adolescents: A systematized review of literature. *Indian Journal of Psychiatry*, *60* (4), 384–392.
37. Mickova, Z. (2017). Gender differences in coping strategies during adolescence. In J. Kralik (Ed.): *Evropské pedagogické fórum 2017: koncepcie vzdělávání a psychologie*. [European Pedagogy Forum 2017: Conception of education and psychology]. Hradec Kralove: Magnanimitas, 239–246.
38. Morris, J., & Twaddle, S. (2007). Anorexia nervosa. *British Medical Journal*, *334* (7599), 894–898.
39. Morrison, J. (2014). *DSM – 5 Made Easy: The Clinician's Guide to Diagnosis*. New York: The Guilford Press.
40. Muehlenkamp, J. J., Engel, S. G., Wadson, A., Crosby, R. D., Wonderlich, S. A., Simonich, H., ... Mitchell, J. E. (2009). Emotional states preceding and following acts of non-suicidal self-injury in bulimia nervosa patients. *Behaviour Research and Therapy*, *47* (1), 83–87.
41. Nevenon, L., Clinton, D., & Norring, C. (2006). Validating the EDI-2 in three Swedish female samples: eating disorders patients, psychiatric outpatients and normal controls. *Nordic Journal of Psychiatry*, *60* (1), 44–50.
42. Paul, T., Schroeter, K., Dahme, B., & Nutzinger, D. O. (2002). Self-injurious behavior in women with eating disorders. *American Journal of Psychiatry*, *159* (3), 408–411.
43. Peebles, R., Wilson, J. L. & Lock J. D. (2011). Self-injury in adolescents with eating disorders: Correlates and provider bias. *Journal of Adolescent Health*, *48* (3), 310–313.
44. Petermann, F., & Nitkowski, D. (2015). *Selbstverletzendes Verhalten. Erscheinungsformen, Ursachen und Interventionsmöglichkeiten* (3., überarb. Aufl.). Göttingen: Hogrefe.
45. Platek, S. M., & Singh, D. (2010). Optimal waist-to-hip ratios in women activate neural reward centers in men. *PLoS One*, *5* (2), e9042, doi: 10.1371/journal.pone.0009042.
46. Rojkova, Z. (2019). *Štatistika prakticky (nielen) v záverečných prácach : aplikácia štatistiky a interpretácia výsledkov v psychologickom výskume*. [Statistics practically (not only) in final theses: application of statistics and interpretation of results in psychological research]. Trnava: UCM.
47. Sansone, R. D., & Sansone, L. A. (2010). Measuring self-harm behavior with the Self-Harm Inventory. *Psychiatry*, *7* (4), 1 – 20.
48. Schoemaker, C., Verbraak, M., Breteler, R., & van der Staak, C. (1997). The discriminant validity of the Eating Disorder Inventory-2. *British Journal of Clinical Psychology*, *36* (4), 627–629.
49. Smithuis, L., Kool-Goudzwaard, N., de Man-van Ginkel, J. M., van Os-Medendorp, H., Berends, T., Dingemans, A., ... van Meijel, B. (2018). Self-injurious behaviour in patients with anorexia nervosa: a quantitative study. *Journal of Eating Disorders*, *6* (26), https://doi.org/10.1186/s40337-018-0214-2.
50. Ward, Z. J., Rodriguez, P., Wright, D. R., Austin, S. B., & Long, M. W. (2019). Estimation of Eating Disorders prevalence by age and associations with mortality in a simulated nationally representative US cohort. *JAMA Network Open*, *2* (10), e1912925, doi: 10.1001/jamanetworkopen.2019.12925.

Primary Paper Section: A

Secondary Paper Section: AN

PSYCHOLINGUISTIC ASPECTS OF FORMATION OF ENGLISH INNOVATIVE CONCEPTS IN THE SPHERE OF PARENTING, BASED ON THE FEELING OF PARENTAL GUILT

^aOLENA LEONIDIVNA GARMASH, ^bOLGA VICTORIVNA TSARKOVA

Bogdan Khmelnytsky Melitopol State Pedagogical University, Hetmanska St. 20, 72300 Melitopol, Ukraine
 email: ^a26garmash@gmail.com, ^bolik.tzarkova@gmail.com

The research is conducted as a part of complex topic of scientific work "Development of methodology of psychological and pedagogical support of families raising children with special needs" (state registration number 0119U002003)

Abstract: The paper investigates parents' feelings of guilt as a psychological basis for the formation of English-speaking innovative concepts in the field of paternity by different metacognitive models. The authors offer a model of formation of English-language innovative concepts as a cognitive reflection of experience of moral traumatization of guilt through the parents' awareness of moral harm and moral suffering. The achievements of the work related to the verbal representation of the English-speaking concepts of the PARENTING sphere, formed by the models of conceptual and metaconceptual derivation, are a contribution to the current state of development of psycholinguistic and lingvo-cognitive theories.

Keywords: English innovative concepts, conceptual derivation, lingvo-mental setting, sphere of parenting, moral traumatization of the parents, children with special needs.

1 Introduction

The beginning of the new millennium is characterized by the modernization and improvement of the anthropocentric paradigm in linguistics, which increasingly acquires the trait of transdisciplinarity and increases its explanatory potential. According to the modern researchers, language is a complex self-organizing system, the elements of which are in constant motion and transformation [Bubnova 2018; Dombrovan 2018]. According to O. Selivanova, the synergetics of the intralingual environment is determined from the outside primarily by the dynamics of ethnoconsciousness as a collective carrier of information about the world and the internal reflective experience of the people, stereotypically and symbolically displayed in its culture [Selivanova 2011] (hereinafter translated by O.L. Garmash). Thus, "changes in language, above all, are the reflection of changes in the thinking of its speakers," and "the linguistic picture of the world only captures the changes that occur in the conceptual picture of the world as each individual and all its speakers" [Levitsky 2001: 101].

It is important to realize that the structure and content of the human inner world are fundamentally different from what they see around them. The conceptual system, as part of this inner world, combines all the mental experience of human interaction with the outside world, including the experience of multiple processing of acquired knowledge, as well as various impressions, experiences, evaluations, images related to the perception of reality and internal mental processes [Boldyrev 2009: 43-44].

Thus, the genetically embedded personal functions of knowledge and formation of the world (surrounding, internal, interactive) determine the prospect of further analysis of mental mechanisms of knowledge organization and their linguistic interpretation in the plane of the new scientific coordinate system, which is represented by cognitive linguistics.

Since the second half of the twentieth century, and until now, cognitive linguistics has continued to exist in the field of linguistic researches. The attempts to explain the nature of cognitive processes and to analyze the universal mental processes concerning the operation and acquisition of language, which were highlighted in the works of J. Bruner and G. Miller, later gained not only considerable popularity, but also scientific spectrality. Subsequently, was found that categorization of human experience is dialectically related to human cognitive activity. Already at the end of the last millennium, "there is a need to look at language in terms of its participation in human cognitive activity" [Balaban 2010: 9].

Orientation of modern linguistics to anthropocentric study of language also contributes to the development of analytical tendencies in knowing the aspects of the formation of the range of its heterogeneous components. Thus, the cognitive vision of the organization and dynamics of functioning of the linguistic structure on the one hand, and the formation of the English conceptual system – on the other, becomes possible only if specific issues concerning the processes of verbalization of the images of the mental ether of human thought are revealed.

It should be noted, that the focus of modern cognitive linguistics on a fundamental transdisciplinary study of the triad of mechanisms of synthesis, interaction and transmission of information makes it possible to move from a cognitive level of cognition (within which the principles of organization of mental units are explored) to a metacognitive level (from Greek μετά-. – between, after, through) of human cognition (within which the principles of formation of the mental units themselves are explored).

First of all, researchers consider concepts as ideal abstract units, meanings, which human operates in the processes of thinking, and reflect the content of experience and knowledge, the content of the results of all human activity and processes of knowledge of the surrounding world in the form of certain units, "quanta of knowledge" [Kubryakova, 1996]. In this connection, N. Besedina rightly notes that conceptual content is transmitted at different linguistic levels [Besedina 2007: 3], and modern scientific thought, along with the category of "knowledge" also operates the category of "metaknowledge" [Kubryakova 2009: 23].

The main function of such metaknowledge is metacognition, which refers to the cognitive function inherent in highly organized consciousness of monitoring cognitive processes, controlling and evaluating their results [Smith 2003: 318]. Thus, the components of metaknowledge are both derivative models (as they demonstrate the human knowledge about the heterogeneous principles of designing such new knowledge units as lexicalized concepts) and morphological metaconcepts (as they demonstrate the human knowledge about their derivative properties in the construction of new derivatives). That is, the first are metacognitive models and the second are metacognitive constituents (morphological metaconcepts).

A new line of cognitive linguistics – metaconceptual derivatology "aimed at finding new points of growth, new perspectives for the study of concepts, based on heuristically important generalizations about their structure, content, interrelations and other constitutive and combinatorial parameters", was introduced as well [Vorobyova 2013: 11]. This trend makes it possible to identify both individual and general patterns of development and functioning of morphological metaconcepts in the processes of conceptual derivation of English-language innovations, including those related to the field of paternity and formed on the psychological basis of guilt.

With regard to feelings of guilt, it should be noted that the vast majority of studies of this psychological phenomenon were performed within the framework of cognitive-behavioral approach, genetic psychology of education [Maksymenko 2008], medical model of family psychotherapy, special and correctional psychology and pedagogy [Skrypnyk 2013; Shevtsov 2009]. The point of these approaches is to identify the social and psychological factors that determine and mediate interaction within families, as well as to reveal mechanisms for pathologizing development of a child with special needs.

At the same time, the deep-psychological determinants of the parents' experience of moral traumatization of the awareness of the child's health status and the experience of paternal guilt due to the reflection of the circumstances of pregnancy, birth and development and the prediction of the child's life prospects and

their reflection in the constitution of new components of the lingvo-mental setting. *The relevance* of this study in the psycholinguistic field is explained by the lack of purposeful research in: a) feelings of guilt of parents *in the context* of moral traumatization of parents; b) multidimensional study of cluster structuring of the concept; c) the influence of feelings of guilt on the formation of English-speaking innovative concepts in the field of parenthood.

In order to achieve this *aim* and to confirm the conception, a set of *tasks* were achieved, namely: generalized the theoretical and methodological bases of the study of guilt in parents raising children with disabilities and functional disorders; the problem of experiencing guilt as a psycho-emotional state, as traits of personality and moral experience was conceptualized, determined its deep psychological underground; has revealed the phenomenon of moral traumatization of parents of children with disabilities, in which irrational attitudes of experiencing guilt produce inadequate ways of overcoming it and lead to secondary traumatization, inadequate models of compensatory behavior; the interdependence of guilt and parents' attitudes towards the psychosocial status of children with disabilities was identified; the anthropocentric paradigm in linguistics and the current state of cognitive linguistics as a transdisciplinary direction were outlined; meaning of conceptual and metaconceptual derivation was revealed; the scientific categories of "knowledge" and "metaknowledge" are interpreted; the metacognitive nature of the conceptual derivation phenomenon was outlined; the role of feelings as a direct information component of the structure of concepts was defined; psycholinguistic determinants of the emergence of new social realities of the paternity sphere, which are formed on the basis of feelings of parental guilt, were revealed; the processes of verbal explication of English-language neologisms of the paternity sphere on the material of modern periodicals of the original language were analyzed.

2 Materials and Methods

To meet the research objectives and to ensure the validity of the main points and conclusions used a set of research methods:

- *theoretical methods*: deductive analysis and meta-analysis – for a systematic description of intrafamilial interaction and the guilt of parents of families towards children with disabilities and functional disorders; inductive analysis – to determine the patterns, systematization, categorization and typologization of guilt experiences and mental states of parents of families towards children with special needs; structural and functional modeling – to build system models of research;
- *empirical methods*: experiment with the use of included observation, clinical conversation, analysis of products of activity, analysis of medical-psychological-pedagogical documentation, psychodiagnostic methods of research.

In order to represent the processes of modeling the components of conceptual and metaconceptual derivation, as well as the verbal explication of English-language innovations in the field of paternity, the methods of metacognitive, fractal, semantic, structural, and comparative analysis were used in the cognitive approach.

3 Results and Discussion

The phenomenon of guilt, as a subjective reality, is logically included in the subject area of a number of sciences, among which science, such as law, cultural studies, theology, philosophy, ethics, and, certainly, psychology, are particularly distinguished [Gumeniuk 2003]. For a more complete and differentiated study of this phenomenon, it is necessary to refer to the experience gained by other branches of knowledge, which in turn will give a clear picture of the specific nature of psychological knowledge regarding this phenomenon [Akatov 2003; Bocheliuk 2011].

In order to gain a better understanding of the phenomenon of guilt in the context of philosophy, it is necessary to consider such philosophical discipline as axiology. It is known that, axiology deals with the study of values as meaningful grounds of human existence, which determine the orientation and motivation of human life, activity, specific actions and deeds. The concept of "value" is used in philosophy and sociology to refer to the human, social and cultural significance of certain objects and phenomena, which sends to the world a proper, purposeful, meaningful basis [Bolycheva 2009].

For this study, it is important that value orientations are elements of the internal structure of the individual, formed and fixed life experiences of the individual during the processes of socialization and social adaptation, which differentiate between significant (essential for a given person) from insignificant (non-essential) through (not) – the personality of certain values, understood as a framework of boundary meanings and fundamental goals of life, and determine the acceptable means of their implementation.

It has been proved in philosophical studies that value orientations determine the general focus of interests and aspirations of the individual, hierarchy of individual preferences and patterns, aim and motivational program, level of claims and prestige preferences, idea of proper and selection mechanisms for selection by criteria of significance, the level of willingness and decisiveness (through volitional components) to the realization of their own "project" of life. They are manifested and revealed through the assessments that a person gives to themselves, to others, circumstances, etc., through their ability to structure life situations, make decisions in problematic and out of conflict situations, through selected behaviors in existentially and morally colored situations, through the ability to set and change dominants of their own life. Moreover, personal crises (often additionally provoked by social ones), as a rule, necessitate the confirmation or rethinking of systems of value orientations, overcoming the contradictions arising in them, therefore, related to the change of activity vectors, self-identification and reflection, self-realization measures, revealing of purposes of life. In these cases, the success of resolving crises and minimizing losses depends on the degree of reflection, dynamism and openness of value orientations. Controversy and integrity of value systems can be seen as an indicator of stability and autonomy of the individual. Accordingly, their contradictions and "severity" – as evidence of immaturity and marginality of the individual, which is fixed due to the inability of the person to make an assessment and make a decision (or, conversely, the willingness to act at once and forever established stereotype), on the one hand, and the difference of verbal and non-verbal behavior – on the other [Kovalov 2001; Lukovkina 2011].

In this sense, it is of interest to study moral experiences, which include the experience of guilt, in terms of philosophical and ethical knowledge. Touching philosophy and one of its sections – ethics in order to study the sense of guilt, we must refer to the concepts of morality, morals, because these concepts explain the existence of such phenomena of human life, such as guilt, reproach, repentance in the act, and ethical knowledge show that the act must be correlated with the subsequent moral reflection of the individual, because often only through further reaction to the action can be judged on the original intention, and therefore on values, meaningful motives, the general orientation of the person [Stoliarenko 2004].

It is also fundamental in this approach to acknowledge the fact that the proper to its value status is fundamentally higher than the existing, so the task of culture and morality is to orient people's real consciousness and behavior to the realization of the proper and, accordingly, moral experience of feelings of guilt, gives a signal of the difference between the proper and the existing and stimulates the behavior of the person towards its elimination.

Undoubtedly, guilt should be included in the subject field of psychology insofar as its experience is an emotional

phenomenon. However, it must be stated that it cannot be considered in isolation from the larger, defining being of human, that guilt is the most important psychological mechanism by which the realization of morality becomes possible [Volkovskaya 2004].

One of the representatives of modern psychoanalysis, J. Weiss, believes that guilt is interpersonal in origin and function and plays an adaptive role in maintaining relationships between people [Deeva 2004 (1)]. If in classical psychoanalysis, the guilt was negatively understood – as a maladaptive emotion, then in the late 1960s and early 1970s, studies conducted along the lines of cognitive psychology changed the view of nature and the processes generated by feelings of guilt. In particular, some positive aspects of the sense of guilt have been noted and it has been proved that, on the contrary, it plays a special role in helping people to adapt in society [Deeva 2004 (2)]. The guilt motivates prosocial behavior by pushing the subject to try to redress his guilt, to compensate for the damage caused, to comfort the injured party. Also, within the framework of cognitive theory, evidence was obtained in favor of an earlier onset of guilt than is claimed in classical psychoanalytic theory [Deeva 2002]. Thus, guilt is a factor in the transformation of human consciousness and one of the components of personality. Possibilities of understanding the phenomenon of the guilt of parents of children with special needs in connection with the theory of interpersonal guilt based on empathic experiences were determined; the theory of the link between guilt and fear and the view of guilt as a moral regulator of prosocial behavior; a factor of self-esteem and prevention of mental disorders.

Guilt is known to be a complex cognitive-behavioral complex that combines fear, self-humiliation, self-aggression and, at the same time, incorporates a system of psychological protections that lessen the emotional tension caused by these negative emotions. It is a state of protection of the individual against internal aggression, which was caused by the punishment of the person themselves [Stoliarenko 2004]. It is believed that guilt is not an innate feeling, it is socially formed by parents or the closest environment (microsociety) – sometimes conscious, sometimes influenced by unconscious tendencies (such as the projection of one's own hidden complexes: self-blame, low self-esteem). Often, children in such families form feelings of guilt by redeeming themselves from the claims of adults. Later, at adulthood, a person involuntarily reproduces this complex within themselves, but does so usually automatically and unconsciously, which is why they are described as: "the appearance of guilt."

As it have been already emphasized, the appeal of domestic psychologists to the phenomenon of guilt occurs, as a rule, within the general theory of emotions and feelings, in the theory of moral development and upbringing, in the light of the study of social adaptation, or in the context of the study of self-awareness and self-esteem. The notion of guilt as a regulatory mechanism for social control, which emerged with the advent of social norms, standards, ideals, is formed on the basis of cultural and anthropological theories.

In the anthropocentric focus of cognitive modeling of the world, the verbocentric format of explication of information about the constituent realities is the only access point through which it is possible to realize the scientific study of the mental processes of conceptual derivation, in which takes place the creation of lexicalized concepts for the designation of vital realities, regarding problems of families, upbringing children with special needs.

In raising the question of the essence of conceptual derivation, the essence of such immediate components as morphological metaconcepts should be highlighted. First of all, it should be noted that morphological metaconcepts are specific components of metaknowledge, that do not self-verbalize because they function at the metacognitive level of the lingvo-mental setting. Their reproduction at the verbal level is only possible through consolidation processes with lexicalised concepts or bifunctional concepts.

It should be noted that concepts "represent bilateral units of linguistic level" [Vardzelashvili 2004: 45] because "they have an expression plan and a content plan" (ibid). Such a level dualism of the information components of human consciousness leads to the introduction of the concept of "lingvo-mental innovation" in understanding the operational component of "lingvo-mental setting" [Mazepova 2015], as a specific consolidated sphere of functioning of the object of study, which, according to the concept of the structure of reality [Popper 2008], represents a three-level structure: cognitive, metacognitive, verbal levels.

It should also be borne in mind that the main function of metaknowledge is metacognition, which refers to the cognitive function inherent in highly organized consciousness of monitoring cognitive processes, controlling and evaluating their results [Smith 2003: 318]. Components of such metacognition are both derivational models (as they demonstrate human knowledge about the heterogeneous principles of constructing such new knowledge units as lexicalized concepts) and morphological concepts (as they demonstrate human knowledge about their derivative properties in constructing new derivative concepts). Thus, the former are metacognitive models and the latter are metacognitive constituents.

Thus, by *morphological metaconcepts* within the study are understood the constituents of the metacognitive level of the lingvo-mental setting, which in the structure of lexicalized concepts convey their content by verbal means of morphemic character and can be considered fractally deterministic identifiers of knowledge, which in the course of processes including concepts that characterize the everyday realities of parenthood.

The fact that a significant number of modern parents are experiencing acute psychological stress cannot be overlooked. In most cases, this applies to those who are in a psychological state of anxiety about guilt. It is appropriate to consider the parents' experience of blame for children with special needs as a psycho-emotional state, as a trait of personality and moral experience in the context of their deep psychological determination, the peculiarities of the experience of family well-being and the attitude of parents to the psychosocial status of children with disabilities.

Table 1. Generalized indicators of guilt of parents of children with disabilities

Characteristics of guilt	average	median	mode	Stand. dev.	Max.	Min.
Measuring feelings of guilt and shame (TOSCA, J.P. Tangney)						
Condition	71,2	76	78	12,5	99	33
Shame	56,4	56	45	17,6	90	6
Externality	73,7	77	78	13,7	99	33
Detachment	74,8	77	78	15,5	22	23
Beta-pride (positive assessment of the actions according to the relation to other people)	61,4	65	55	17,8	99	6
Alpha pride tendency to self-esteem	48,9	45	45	18,7	89	6
Guilt Inventory (K. Kugler, W. Jones)						
Guilt-condition	52,2	55	55	17,4	89	11
Guilt- feature	61,1	65	66	20,6	99	12
Moral norms	44,9	44	22	18,6	89	6
<i>Indicator: 0-20% low level; 21-40 reduced; 41-60 average; 61-80 increased; 81-100 high.</i>						

Actually, the experience of guilt, is considered as the main psychological basis for the formation of many English-language innovations in the field of parenthood. Considering in our work concepts as cluster structures, which consist of certain quanta of knowledge, we rely on the modern quantum approach [Kholod 2019], as a perspective method of psycholinguistic research. Thus, the quantum principle of thought formation allows us to describe the choice of consciousness of any one option from a large number of variants of those images of reality that are stored throughout life in the conscious and unconscious human experience [Kholod 2019: 344].

First of all, we have to note, that the cluster spectrum of a concept includes such a mentocentric cluster as "**feelings**" [Garmash 2015: 82]. Using *metacognitive analysis*, which is based on a transdisciplinary approach, and using a *modeling method* embodied in the transdisciplinary *principle of cluster representation*, have been developed models of the lexicalized concept and the morphological metaconcept based on the principle of the triadicty of the *verbocentric, mentocentric and metacentric* information. Therefore, their internal organization is represented as follows: (verbocentric – "phonetic variants", "formatic variants", "semantic variants", "grammatical variants"; mentocentric – "references", "visuses", "feelings", "mimes"; metacentric – "genesis"). With regard to the information content of the cluster, the "feeling" should be emphasized that within it contains a message about the emotional coloring of the concept, they represent the "emotional-evaluative component" of the concept [Matuzkova 2015: 82], in the same regard, the image of any object is associated with a certain emotion. In addition, this thesis demonstrates a sustainable interaction between the clusters of "visuses" and "feelings". Within this cluster mentally represents "a network of interconnected thoughts, memories, feelings and expressive-motor cognitively-mediated reactions" [Urnov 2008: 44]. Feelings are an emotional aspect of mental life and its manifestations (cognitive structures).

Emotions differ in their function and can act as components of cognitive structures, and as components of mental states of human. In this connection, the thesis about the perception of emotions is relevant as "the reflection in the brain of the subject of his evaluative relations to meaningful objects" and as the mental state of the subject-carrier of emotions [Danko 2008: 48-49]. Unlike moods and emotions, feelings have a clear objective attachment. They arise in relation to something or someone (conceptual structures), not to the situation as a whole (frame structures).

That is, the release of a particular variant of such an informational component of the concept as "visuses" is accompanied by the release of a certain variant of feelings. The processes of categorizing information contribute to the formation or transformation of the components of the "feeling" cluster. In this regard, in modern English, the range of concepts themselves is used to denote this kind of present-day realities, including those directly related to the field of paternity. In today's world, the problem of physical and psychological maladjustment of children, usually children with special needs, as well as their parents and loved ones, is becoming more widespread.

One should consider these innovations and their creation models in more detail. Thus, using such a model of metaconceptual derivation, such as affixation, which consolidates operational variants of the lexicalized concept and morphological metaconcept, such lexicalized concepts were created: HYPER-PARENTING, KINDERGARCHY, SKINSHIP and others.

Thus, the guilt of parents usually determines the particular style of parenting, the so-called "hyper parenthood", in which parents are actively involved in the management, planning and enrichment of all aspects of their children's lives. This vital reality is reflected in the hyper-parenting (*hyper- + parenting*) neologism. *We live in an age of hyper-parenting, where a child is the ultimate validation of an adult's ego and the little time they have to spend with them must be "quality time". There is little room for deviance, boredom or unplanned curiosity in the modern child's routine, especially when the parents return home from long hours at work.* (The Age (Melbourne, Australia), April 30, 2004)

Instead, to indicate the rule or domination of children; convinced that the needs and preferences of children take priority over the needs of their parents or other adults, the kindergarchy innovation was created (*kinder + -archy*) n. *In these misguided days of the Kindergarchy, we 'aunties' and 'uncles' must urgently rise up and take far more seriously our responsibilities as increasingly isolated champions of truth in a world of*

parental illusion. And just the other week, a pretty good start was made. (Sunday Tribune, July 13, 2008)

The feelings of parental guilt are also expressed in the need for constant maintenance of physical contact with the child, which realizes a sense of affinity and affection between two people, in particular mother and child, caused by hugs, touch and other forms of physical contact. This reality is reflected in the concept of skinship (*skin + -ship*) n. *Brue's depiction of herself as a bumbling innocent abroad isn't entirely believable, but her approach to other cultures is refreshingly humble, and her devotion to the pleasures of bathing with strangers makes a seductive case for 'skinship', in which, naked together in the same water, "you do away with all the normal social barriers in life."* (The New Yorker, January 20, 2003)

Such a metacognitive model of conceptual derivation, as a word-formation by which operational variants of lexicalized concepts are combined, has proven itself in the formation of a whole series of innovations. Among them are the following concepts: baby-lag, car-schooling, flat daddy, floortime, free-range child, granny nanny, helicopter parent, kangaroo care, lawnmower parents, milk brain, mom as a service, mom cave, mom-shaming, nag factor, nanny-envy, pester power, redshirting, stealth parenting, virtual visitation and more.

Thus, extreme fatigue and disorientation due to the sleep deprivation associated with parenting a baby, usually with certain disabilities, have been reflected in the English-speaking neologism of baby-lag n. *New parents who mistakenly put milk in a washing machine and socks in a fridge are not going crazy...they are suffering from 'babylag'.* (The Daily Mail, September 14, 2012)

English-language innovation car-schooling n. means educating or instructing a child while driving in a car, that also demonstrates our parents' guilt about children from their lack of leisure time. *Louis C. DeLuca, a semiretired salesman and a state senator in Connecticut, has had it with people reading the newspaper on the steering wheel, car-shooling their kids from the front seat and drive-time dining. He is the sponsor of a bill, passed Monday by the legislature's Transportation Committee, attacking "driving while distracted."* (The New York Times, April 4, 2001)

Quite often, the feeling of parental guilt is caused by the inability to communicate with the child through job responsibilities. Thus, an enlarged, usually life-sized photograph of a deployed soldier, used to comfort that soldier's children, is called flat daddy n. *To make your daughter feel good at home, you can tape your husband as he reads books to her and then play one of those tapes after he leaves, while she holds the book. You can make a 'flat daddy' for her, too, by having a big enlargement made of your husband's picture and hanging it on her bedroom door or sitting it in your husband's chair at dinnertime.* (The Washington Post, September 8, 2006)

A therapeutic or parenting technique in which an adult engages in creative play with a child, often including getting down on the floor with the child, is known as floortime n. *Autism is believed to involve between ten and fifteen genes. There is currently no in-utero test for autism, as there is for Down syndrome. There is no simple dietary intervention for autism. Every few years, new miracle treatments for autism have been touted-and subsequently discredited. Some parents are proponents of 'floortime' (getting down on the floor and playing with the child, letting the child take the lead in playing) and others of having the child swim with dolphins, but no studies on the efficacy of such treatments have been published.* (The New Yorker, December 1, 2003)

English-language lexical innovation free-range child n. indicates a child who is given lots of time for unstructured activities and play during the day. This attitude towards the child is also shaped by a sense of guilt, by the belief that they are suffering, and therefore cannot be deprived of comfort *In his new book Under Pressure: Rescuing Childhood from the Culture of Hyper-*

Parenting, Canadian philosopher and writer Carl Honoré wrestles with his own well-intended overparenting and taps into a number of schools and families inspired by the free-range child. (The Globe and Mail, May 13, 2008)

Language innovation granny nanny n. arose to nominate a grandmother who cares for her grandchildren while their parents are working. *One way is that we're in our grandchildren's lives more than ever before, whether from across the country thanks to Skype and FaceTime or as 'granny nannies' – in some cases full time.* (The New York Times, May 13, 2017)

The social phenomenon of hyper-parenthood and the guilt of a child created the conditions for the emergence of an innovation that denotes a father or mother patrolling children and ready to help them at any time. This reality is now referred to as the helicopter parent n. neologism. (A parent who hovers over his or her children.) Other gender oriented nominations are also used: helicopter mother / helicopter mom / helicopter dad. *Parents of millennials have been obsessive about ensuring the safety of their children, Howe said. When the first wave was born in the early 1980s, "Baby on Board" signs began popping up on minivans. They were buckled into child-safety seats, fitted with bike helmets, carpooled to numerous after-school activities and hovered over by what Howe describes as 'helicopter parents'.* (The Atlanta Journal and Constitution, August 11, 2003)

Parents' guilt also causes the birth of a premature baby. In modern English, neologism kangaroo care n. denotes neonatal care in which a premature baby is held on the chest of the caregiver with skin-to-skin contact. *Dr. Johnston and her team are looking at various ways of diminishing pain in preterm babies. They found, for example, that skin-to-skin contact between premature babies and their mothers can reduce the discomfort caused by painful procedures. This 'kangaroo care', seems to promote a sense of security in the babies.* (Newswire, May 16, 2002)

The sense of guilt of the parents causes the desire to correct something in the life of their child. Therefore, lawnmower parents n. is used to refer to parents who try to smooth their children's paths through life by solving their problems for them. *Director Prof Alan Hayes said lawnmower parents had taken up where so-called "helicopter" parents left off. "Instead of hovering over their children closely monitoring them as helicopter parents are said to, lawnmower parents get out in front of their children to try and clear the way for them," he told the Herald Sun.* (Herald Sun, April 14, 2011)

Caring for a mother with her newborn baby is also associated with a sense of guilt because of the infant's helplessness, her special needs. Thus, feelings of disorientation and mental sluggishness reported by some mothers of newborn babies; total involvement in the care of a newborn baby, to the exclusion of almost everything else, has been reflected in the new language unit milk brain n. "Milk brain." *It's a casual, common slur. Even women use it to describe how disorganized they feel in the first frantic days after giving birth. Yet milk brain is just a temporary effect, brought on by sleep deprivation, plus the need to learn (or relearn) the details of child care. The lasting effect of being a mother, neuroscientists are finding, is the exact opposite of milk brain.* (The Globe and Mail, February 18, 2006)

Also created using a metacognitive word-building mechanism, mom as a service n. Innovation nominates software and online tools that provide services similar to the tasks performed by a mother. Such a need to use robotic maternal care for a child is also closely linked to a sense of guilt through the inability to devote sufficient time to the child. *This small subculture of wealthy technophiles promotes investment into luxury goods for rich people, or into 'mom as a service' types of companies that cater to spoiled workaholics in the tech industry. And so we end up with things like a \$120M juice squeezer, or three startups competing to deliver organic baby food.* (Idle Words, May 10, 2017)

Feeling guilty of a woman towards a child due to the defects of her development leads to constant stress. Because of this, psychologists advise not to ignore their own desires and right to their own lives. To do this, they recommend to create for themselves their own "mother's cave" area, where a woman will be able to rest and do her own business. This area of a house that a woman can decorate to her tastes and be alone to pursue her own projects and interests, was named mom cave n. There are also formats of *mum cave / woman cave. But these days, women are chiseling out their own sanctuary, taking over a room, nook or even a closet and making it their 'mom cave'. A mom cave is the place where the woman who nurtures everyone goes to nurture herself, said Elaine Griffin, New York City interior designer.* (USA Today, January 22, 2011)

The lexical innovation of mom-shaming n., (also in the variants of *mom shaming* and *mommy shaming*) is used to denote the public reproach of a mother for actions or opinions that are perceived to be inappropriate or harmful to her children. *I'll take an honest expression of disapproval any day over the smug, passive-aggressive mom-shaming that goes on every day on the playground and in the comments sections of every parenting blog.* (The Globe and Mail, October 29, 2015)

The degree to which parents' purchasing decisions are based on being nagged by their children, has become linguistically updated in neologism nag factor n. *Trade conventions are held across the country to develop strategies to entice children to certain products and then get them to cajole their parents into buying the products. Those in the industry call it the 'nag factor' or "pester power." Children between the ages of 12 and 17 typically will ask nine times for an advertised product in the hope their parents will give in, according to a recent survey conducted by The Center for a New American Dream, a consumer and environmental group based near Washington. More than half the parents surveyed said they do, ultimately, buy the product.* (The Denver Post, July 23, 2002)

Feelings of envy directed at one's nanny because of the amount of time she or he gets to spend with one's children; feelings of envy directed at women who have nannies, has been called nanny-envy n. *The financial iniquities of the childcare system and the high cost of nannies, particularly in London, are an exacerbating rather than a definitive factor here. It's a decidedly more personal thing; indeed, nanny-envy can sometimes teeter over into nanny-spite or a visceral nanny-hatred – especially, it would seem, if the nanny is very young and attractive.* (The Spectator, November 29, 2003)

The aforementioned "kindergarchy" phenomenon, which arises against the background of a sense of parental guilt, is also realized in the concomitant concept of pester power n., which indicates the ability children have to nag their parents into purchasing items they would otherwise not buy or performing actions they would otherwise not do. *(Nine out of every 10 pupils questioned claimed they wanted to learn about energy efficiency in schools. The centre adds that a key benefit from encouraging pupils to tackle the issue is the wider impact their new understanding appears to have in the community. Children are using their pester power to turn school learning into positive energy-efficiency habits at home.* (The Guardian, January 29, 2002)

Parents' sense of guilt is also actualized in the practice of holding a child out of kindergarten for one year in the hope that the child will then do better academically and socially. This reality is called redshirting n. *Academic redshirting is a result of higher expectations of kindergartners, some educators say, and makes sense for students with summer or early fall birthdays, or for ones, usually boys, too immature to handle kindergarten.* (The Wilkes-Barre Times Leader, August 10, 2006)

Such a life-like phenomenon as performing childcare duties while pretending to be at a business meeting or other work-related function, was actualized in neo-logism stealth parenting n. *The result of all this hypocrisy is "stealth parenting" by fathers with any ambitions at work. They lie about 'breakfast*

meetings' when they take their children to school and 'client appointments' when they sneak out to look after a sick child. (The Times, October 23, 2002)

Long-distance access to a child by a divorced parent using technology such as a broadband Internet connection and a webcam is denominated in modern English with the virtual visitation n. innovation. "It's funner than talking on the phone, because I can see him," said Arielle, 10, who lives with her mother in Longmont, Colo., but has regular 'virtual visits' with her father as part of the custody arrangement her parents worked out after her mother moved eight years ago. "It's just like being in front of him, but with games and computer stuff added." (The New York Times, March 19, 2006)

A set of English-language innovative concepts formed through the metacognitive mechanism of conceptual derivation, such as blending, include: AFFLUFEMZA, JUVENOIA, KIDDIE CAM, MOMOIR. The operational material for the processing of this model was also the operational variants of lexicalized concepts.

The tendency to assume that the anxiety and stress felt by affluent mothers who have to choose between staying at home or pursuing a career, is felt by all mothers regardless of their socioeconomic status, has been embodied in the English-language innovation *afflufemza* n. according to an innovative three-component model (*affluence + influenza + female*). Today, the problem has a name, alright. Lots of them. So many, in fact, that you need a bound glossary to keep track of all the trends and afflictions plaguing modern mothers. *Opt-out revolution. Intensive mothering. Domestic glass ceiling. Afflufemza. Choice feminism. Mother guilt. And, recently, mothers belting out the Boredom Blues.* (The Toronto Star, September 9, 2006)

The sense of guilt also arises in the parents through the awareness of their own impotence to divert the child's attention from the Internet, to prevent numerous mistakes of children in interactive communication, self-expression, use of destructive information resources, etc. In general, such concerns are not always reinforced by real threats to children. Thus, the baseless and exaggerated fear that the Internet and current social trends are having negative effects on children is reflected in the new lexicon unit *juvenioia* n. (*juvenile + paranoia*). And yet the overall rates of child sex crimes and of teen sex are down since the 1990s, as are juvenile crime, school violence and teen fighting. David Finkelhor, director of the Crimes Against Children Research Center at the University of New Hampshire, calls this distance between anxiety and reality 'juvenioia' and chalks it up to an "exaggerated fear about the influence of social change on children." (The New York Times, June 26, 2011)

The feelings of parental guilt, as it was noted above, are sharply felt by parents who are forced to be at a distance from their child. Therefore, a camcorder that displays a live feed, so parents can monitor either their children or their children's babysitter from a remote location has been called *kiddie cam* n. (*kiddie + webcam*). Little Sunshine's Playhouse Day Care...is a 24-hour day-care facility that is licensed to hold 64 kids per shift. There will be 24 employees working around the clock...There will be video cameras called 'Kiddie cams' in each room that allow parents to go onto a Web site to watch their children playing anytime during the day or night. (Springfield News-Leader, May 27, 2002)

English-speaking innovation *breastsleeping* n. (*breastfeeding + co-sleeping*) originated the practice of sharing a bed with an infant as an aid to breastfeeding. This innovation also demonstrates a lexical explication of the reality associated with a parent's primary sense of guilt over the helplessness of a newborn baby. In a peer-reviewed report published in *Acta Paediatrica*, McKenna argues that we should return to 'breastsleeping', the act of combining breastfeeding with infant sleep, a co-sleeping model that mothers around the world have been practicing for thousands of years. (The Huffington Post, October 6, 2015)

The metacognitive model of blending derivation also played a role in the formation of the English-language neologism *momoir* n. (*mom + memoir*) used in communication to nominate a memoir about motherhood. As a rule, they reveal a range of maternal experiences and feelings of guilt towards the baby. In such "momoires" women describe their own mistakes in raising a child with certain development features. In *May, she came out with "Bad Mother: A Chronicle of Maternal Crimes, Minor Calamities, and Occasional Moments of Grace," a new bestselling book from Doubleday that extolls the virtues – with all its conflicts – of modern motherhood as an exercise in laxity....She isn't alone. Waldman's book is one of a new batch of 'momoires' hitting the shelves, written by Jewish women who cop to being a certain kind of "bad mother."* (Forward, July 31, 2009)

The metacognitive model of acronym has contributed to the emergence of such an innovative concept as *SMUM* n. (*smart, middle-class, uninvolved, mother*) denoting a woman who finds motherhood and her children tedious and uninteresting. In this case, one can talk about the guilt felt by her father, grandparents, or the people raising her. A lexicalized concept such as *SMUM* emphasizes the fact that the father of the child, or the caregivers of relatives, may feel guilt over the child's separation in maternal love. *I know (and have been known to like) these women. I even have moments when I wished I had their game, but I can only be the SMUM that I am: distracted, well-meaning, ambitious for myself. But my kids know I'll always be there for them when the chips are down, even if I'm not actually going to get up to serve them any chips.* (Los Angeles Times, August 5, 2006)

With such an innovative metacognitive model of conceptual derivation as an affixoblending, which is on the way of its formation, the lexicalized concept *lactivist* (*lacto-* ("milk") + *activist*) has been formed, which denotes an activist who promotes breast-feeding over the use of infant formula. In this case, there is also a sense of guilt through the awareness of the child's indulgence in the most natural diet. *The site has become the target of an angry letter-writing campaign by pro-breast-feeding parents, medical professionals and 'lactivists' all over the world.* (Chicago Sun-Times, February 2, 2001)

It should be noted that the basis of this metacognitive model is a blend of affixocompounding and blending mechanisms. Thus, the operational base is the operational variants of the lexicalized concept and the morphological metaconcept, and in the process of pairing the lexicalized concept is transformed into an imaginary morphological metaconcept.

At the same time, the deep essence of what a person creates and how he or she forms it, remains the subject of much scientific research. In the same regard, it is worth emphasizing the opinion of L.S. Pikhtovnikova, who says that the criterion for choosing a unit ... is multidimensional, integral. It cannot be fully interpreted in the same way as not all the notions and meanings of the concept can be fully realized [Pikhtovnikova 2015: 109]. A customized cognitive system helps... (ibid), including metacognitive models that enable the processes of conceptual derivation.

4 Conclusions

Therefore, a sense of parental guilt is a complex psycholinguistic phenomenon, the study of which, taking into account the interaction of external and internal factors of socio-cultural activity, allows not only to explain the structure of such lingvo-mental structures as concepts, but also to determine the peculiarities of their formation and functioning in modern English language. This study found that a sense of paternal guilt has a deep psychological determination associated with a specific set of psychological protection mechanisms, the presence of appropriate intrapersonal conflicts and irrational attitudes. First of all, feelings of guilt apply to parents of children with special needs and appear to be a complex, primary, in-family psychological traumatizing experience. That is why experiencing interpersonal guilt is a bipolar psychological

phenomenon, depending on the type of experience itself: conjunctive (feelings and feelings that unite family members) or disjunctive (feelings and feelings that divide family members).

Moral traumatization from the sense of paternal guilt shows two rational signs: moral harm – moral loss associated with moral and physical suffering, limitations, loss, and moral suffering – negative experiences that manifest in the form of fear, shame, humiliation, state of mind, a state of depression and apathy. Trends and obsessive thoughts about compensation and actually compulsive compensatory behavior are the main signs of moral traumatization – traumatization from the experience of guilt.

Moral suffering, as an experience of personal reality, is determined by the conflict between conceptually-rational images of reality and images of reality, the genesis and constitution of which are the determination of the unconscious. Unconscious determinants of parental guilt can be revealed through existential suffering and irrational personality traits. The archetypal program of irrational guilt constitutes in the subject's mind a sense of irrational responsibility that determines irrational patterns of parental behavior.

Consequently, constantly present individual suffering in the existential space of the person is a precondition for the genesis and center of the formation of conscious moralizing self-blame phenomenon, thus, the sense of paternal guilt becomes in the mental reality of personality constantly acting center of anxiety, the point of concentration and the point of concentration, lingvo-mental structures as concepts of parenthood.

The presented psycholinguistic study about the processes of formation of English-speaking innovations in the field of paternity confirms the opinion of researchers that conceptual derivation is a cognitive process that, through the integration of concepts existing in the conceptual system of personality, provides the emergence of new structures of knowledge [Babina 2009: 503]. Formed in the course of cognitive activity, concepts are objectified in language and become an integral part of the conceptual system. At the same time, they maintain a derivative link with the source structures and form the basis for the further development of the system (ibid).

Thanks to the modeling of the concept as a multicenter lingvo-mental formation, which combines: a) verbocentric, b) mentocentric and c) metacentric information, it was found that feelings of paternal guilt can constitute the informational content of such mentocentric cluster of lexicalized concept as "feelings". Therefore, the role of human experience in the formation of both a separate concept and the whole conceptual system of modern English becomes direct and obvious. The obtained results confirm the thesis of the modern researcher A. Kholod that the quality of human thoughts is directly proportional to certain models, schemes created by the states of neurons and their networks [Kholod 2019: 344].

The results of the research show that the lexicalized concepts of the paternity sphere, which were formed on the basis of feelings of paternal guilt, by their appearance represent the effect of both stable and innovative metacognitive mechanisms of conceptual and metaconceptual derivation. Thus, the most productive were the stable models of word addition and affixation, much lower productivity is demonstrated by blending, acronym and innovative metacognitive model of affixoblending.

Thus, it is considered expedient to talk about the metacognitive nature of the conceptual derivation phenomenon, which is a component of the information space of all mankind and is formed on the general principles of "cosmogenetic symmetry" [Wenk 2004]. Scientific analysis of conceptual derivation as a component of the linguo-mental setting makes it possible to find out the in-depth principles of the development of the mental spectrum of anthropic cognition and metacognition, the psycholinguistic principles of the formation of the English-speaking vocabulary, which outlines the prospects for further research in this direction.

Literature:

1. Akatov, L. I. Social rehabilitation of children with disabilities. Textbook. Psychological foundations. Moscow: Humanity Center WLADOS, 2003. 368 p.
2. Babina, L. V. The cognitive aspect of learning derived verbs. Horizons of Contemporary Linguistics: Tradition and Innovation. Moscow: Languages of Slavic cultures, 2009. pp. 503–511.
3. Balaban, O. Cognitive linguistics the present. Bulletin of LNU. T. Shevchenko Philological Sciences, Luhansk, 2010. 18 (205). pp. 9–16. Available from: http://dspace.ltsu.org/bitstream/123456789/260/1/%E2%84%96%2018_205_2010_%D0%A4%D0%9D.pdf#page=10
4. Besedina, N., & Boldyrev, N. Cognitive mechanisms of morphological representation in language. News RAN Literature and Language, 2007. 66 (1). pp. 3–10. Available from: <https://core.ac.uk/download/pdf/151221859.pdf>
5. Bocheliuk, V. Y. Psychology of a person with disabilities: teach. manual. Kiev, CUL, 2011. 264 p.
6. Boldyrev, N. Evaluative metarepresentation: problems of learning and description. Cognitive language studies. Tambov, Publishing House of TSU named after G. R. Derzhavin, 2009, 5, pp. 43–51.
7. Bolycheva, O.V. Personification of knowledge: towards the definition of the concept. Postgraduate education bulletin, Psychology, Kiev, 2009. 11 (2), 36-44. Available from: <https://docplayer.ru/27534523-Personifikaciya-znaniy-k-opredeleniyu-ponyatiya.html>
8. Bubnova, I., & Kazachenko, O. Dynamics of the Semantic Content of the Word Freedom. Psycholinguistics, (2018). 23(2), pp. 11–24. doi: 10.5281/zenodo.1199099
9. Danko, S. G. States of the human cerebral cortex during internal induction of emotions. Cognitive language studies. Moscow: Institute of psychology RAS, 2008. 2. pp. 48–72.
10. Deeva, N. A. (1). Study of the peculiarities of experiencing a crisis in adolescence and the specificity of providing psychological assistance. Practical psychology in pedagogical universities: state, problems, prospects: Abstracts. Moscow: MPGU, 2004. 77-80.
11. Deeva, N. A. (2) Experiencing a crisis in adolescence. Psychopedagogy in law enforcement. Omsk city academy of the Ministry of Internal Affairs Russia, Omsk, 2004. №2 (22). pp. 60-62.
12. Deeva, N. A. Reflexive mechanisms of self-understanding. Personality in the modern world: from a survival strategy to a life-creation strategy. Complex «Grafika» Ltd., Kemerovo, 2002. pp. 123-124.
13. Dombrovan, T., & Oleksandrenko, K. Language Development as a Change of the Parameter Pattern of the Language System. Psycholinguistics, 2018. 23(2), 66–80. doi: 10.5281/zenodo.1210061
14. Garmash, O. L. English morphological concepts: fractal parameterization. ZNU, Zaporizhzhia, 2015. 438 p.
15. Gumeniuk, O. Y. Spontaneously spiritual organization of the self-concept of the universe. TNEU. Economic thought. Ternopil, 2003. 40 p.
16. Kholod, A. The Problems of Psycholinguistic Research Methodology and Quantum Approach. Psycholinguistics, 2019. 25 (2), 338–370. doi: 10.31470/2309-1797-2019-25-2-338-370
17. Kovalov, S. V. Psychology of family relations. Kyiv: Nauka 2001. 253 p.
18. Kubryakova, J. S. A Concise Dictionary of Cognitive Terms. Moscow: MGU, 1996. 245 p.
19. Kubryakova, J. S. About Cognitive Process occurring in the course description language. Cognitive language studies. Moscow: Institute of linguistics RAS; Tambov: TSU, 2009. 5. 22–29.
20. Levitsky, A. E. Comparison of functional features of systems of nominative units of English and Ukrainian languages. Bulletin of Ivan Franko Zhytomyr State University. Zhytomyr, 2001. (8). pp. 101–105.
21. Lukovkina, A. N. Features of parent-child relationships in a family with a child with developmental disabilities. Modern problems of family psychology: phenomena, methods, concepts.

- St. Petersburg: Publishing house of ANO «IPP», 2011. (5) pp. 52-57.
22. Mazepova, O. V. The inner world of man in the Persian lingvo-mental space. Kyiv: D. Burago Publishing House, 2015. 440 p.
23. Maksymenko, S. D. General Psychology: 3 edition. Textbook. Kyiv: Center of Educational Literature, 2008. 272 p.
24. Matuzkova, O. P. English Identity as Linguocultural Phenomenon: Cognitive-Discursive Aspect. Cognition, communication, discourse. Kharkiv: V.N. Karazin Kharkiv National University, 2015. № 11, pp. 68-86. Available from: <https://sites.google.com/site/cognitiondiscourse/vypusk-no11-2015/matuzkova-e-p>
25. Pikhtovnikova, L. S. Self-organization of speech works: information and cognitive aspect. Synergetics in Philological Studies. Kharkiv: V.N. Karazin Kharkiv National University, 2015. pp. 102-135.
26. Popper, K. R. Knowledge and the Body-mind Problem: In Defence of Interaction. Psychology Press. L.: Routledge, 1994. 128 p.
27. Selivanova, E. Mechanisms of neologization in the synergetic systems of language and ethnic consciousness. Linguistic Bulletin. Collection of scientific works. Cherkasy: ChNU of Bohdan Khmelnytsky, 2011. 12-13, pp. 199-202. Available from: http://eprints.cdu.edu.ua/391/1/Movoznav_vesnik_12-13.pdf
28. Shevtsov, A. H. Educational basics of rehabilitation. National Pedagogical University named after M.P. Drahomanov, Institute of Correctional Pedagogy and Psychology. Kyiv: MP Lesia, 2009. 484 p.
29. Skrypnyk, T. V. Standards of psychological and pedagogical assistance to children with autism spectrum disorders. Textbook. Kyiv: Pedahohichna dumka, 2013. 66 p.
30. Smith, J. D., Shields W. E., Washburn D. A. The comparative psychology of uncertainty monitoring and metacognition. Behavioral and Brain Sciences. Cambridge University Press. 2003. 26 (3), pp. 318-373.
31. Stoliarenko, A. M. Psychology and pedagogy. Textbook. Moscow: JUNITI-DANA 2004. 423 p.
32. Urnov, M. Y. Emotions in political behavior. Moscow: Aspekt Press, 2008. 240 p.
33. Vardzelashvili, J. Concept as a linguistic category - "constructive essence". Collection of scientific papers - Tbilisi State University. Faculty of Philology. Tbilisi, 2004. pp. 39-45.
34. Volkovskaya, T. N. & Jusupova, G.H. Psychological assistance to preschoolers with general speech underdevelopment. Moscow: Knigoljub, 2004. 104 p.
35. Vorobyova O. Conceptology in Ukraine: an overview of the problematic. Lingvoconceptology: perspective directions. Luhansk: LNU T. Shevchenko, 2013. pp. 10-38.
36. Wenk Brian A. Unifying Consciousness with the Universe. Author House. 2004. 160 p.

Sources

- The Age (Melbourne, Australia), April 30, 2004
 Sunday Tribune, July 13, 2008
 The New Yorker, January 20, 2003
 The Daily Mail, September 14, 2012
 The New York Times, April 4, 2001
 The Washington Post, September 8, 2006
 The New Yorker, December 1, 2003
 The Globe and Mail, May 13, 2008
 The New York Times, May 13, 2017
 The Atlanta Journal and Constitution, August 11, 2003
 Newswire, May 16, 2002
 Herald Sun, April 14, 2011
 The Globe and Mail, February 18, 2006

Primary Paper Section: A

Secondary Paper Section: AI, AN

THE IMPACT OF MACROECONOMIC INDICATORS ON VAT REVENUES IN EU COUNTRIES

^aALENA ANDREJOVSKÁ, ^bMARTINA HELCMANOVSKÁ

^{ab}*Faculty of Economics, Department of Finance, Technical University of Košice, Boženy Němcovej 32, 040 01 Košice, Slovak Republic*

email: ^aalena.andrejovska@tuke.sk, ^bmartina.helcmanovska@tuke.sk

This research was supported by VEGA project No. 1/0430/19 Investment decision-making of investors in the context of effective corporate taxation.

Abstract: The paper deals with the issue of the impact of changes in selected macroeconomic indicators and the standard VAT rate on the amount of VAT revenue. The aim of the paper was to empirically verify this impact. The analysis was performed using a linear regression analysis and an econometric model, which determined the magnitude of changes in VAT revenue as the indicators increased. Subsequently, it was necessary to point out the correspondence between the calculated and the actual VAT revenue. The analysis followed GDP, consumption expenditure, exports, imports and the VAT rate in the 28 EU countries for the period 2004-2018, while the countries were considered as a separate territorial unit. The contribution set out a hypothesis that was not confirmed, as GDP had the most significant impact on VAT revenues. This caused the most significant increase in VAT revenue by EUR 139,300 while increasing GDP by 1 million EUR. The calculated VAT revenue based on the compiled econometric model indicated that with slight deviations, it copies the actual value of VAT revenue. Based on the analysis, we can conclude that the selected indicators and the level of the standard rate are variables that affect the amount of VAT revenue.

Keywords: econometric model, macroeconomic determinants, regression analysis, standard VAT rate, VAT revenue.

1 Introduction

Revenue to the state budget, the main part of which is tax revenue, is the main mechanism for ensuring economic development. Value added tax, the revenue of which accounts for almost half of all tax revenue within the EU, is financed and secured by the EU's internal market. For the state, value added tax represents an inflow of funds directly into state budgets and is one of the most important taxes that affects every consumer, which is confirmed by many authors (Cnossen 1990; Ebrill et al. 2001; Bendikienė and Šaparnis 2006; Keen and Lockwood 2006). VAT is applied throughout the European Union and is a key instrument of fiscal policy. The importance of this tax covers two levels: the common European market and national markets (Simonides and Feranecová 2017 and Mura et al. 2015).

This contribution is deducted from income only from the standard VAT rate. The rate is determined by each country individually, so rates may vary from country to country, with the rate not being less than 15 % and not more than 27 % (Baskaran and Lopez da Fonseca 2014). Revenues from this tax vary from different amounts of fixed VAT rates. Based on the development of VAT revenues, revenues since the economic crisis of 2008 have increased in all EU countries. The final amount they receive from VAT is also affected by various factors, such as the level of consumption, from which GDP is derived, which concisely defines the economic situation in a given country.

2 Literature review

When fulfilling the state budget, revenue from value added tax is the most important source. The system of collection and payment of value added tax provides opportunities for tax evasion, which, in combination with the high volume of domestic and international transactions, ranks VAT among the most risky taxes. Many authors such as Keen and Smith (2007), Brederode (2008), Tumpach et al. (2014) and Dharmapala (2014) deal with tax evasion. The potential revenue from this tax is the difference between the theoretical VAT base and the VAT actually paid multiplied by the weighted average VAT rate. The theoretical portfolio for the sum of all macroeconomic aggregates for which the need to pay VAT applies is specified by the state (MFSR 2019). Slemrod (2003) evaluates two theoretical directions, namely the traditional school of economics and the modern one, where he summarized the impact of VAT revenue on the economy. The modern school of

economics says that in the long run, a higher tax rate contributes to economic prosperity. Subsequently, the government from a higher tax collection can use these funds for the development of the country, which ultimately supports the growth of economies. Bogetic and Hassan (1993) were one of the first authors to address the issue of determinants affecting VAT revenue. Within the EU and Asia, they concluded that one of the variables that affects and increases VAT revenue is the VAT rate.

The effective collection of taxes and the VAT revenue itself is affected by various variables. One such factor is the economic situation in a given country, which best describes GDP as well as GDP per capita. Godin and Hindriks (2015) found in the period from 1980 to 2010 that economic growth, openness of economies and the size of tax rates have a positive effect on VAT revenue. The positive impact of economic openness is also confirmed by Keen and Lockwood (2010), who supplement GDP with it and at the same time say that countries with higher GDP tend to have lower VAT revenues. Hodzic and Celebi (2017) state that for the period from 2009 to 2013 from EU countries, Croatia achieves high VAT revenues expressed as a percentage of GDP. The level of consumption in a particular country is also a crucial variable on which VAT collection depends. Higher consumption of goods and services is associated with higher levels of GDP per capita, which leads to an increase in VAT revenues (Sarmiento 2016). Onaolapo et al. (2013) in their contribution to the Nigeria study showed that the VAT rate is statistically significant to VAT revenue, which also speaks to the benefit of this tax for the economy as a whole. Mach (2018) argues that reducing this tax in the Czech Republic can help both the state budget and taxpayers.

The amount of VAT income also depends on the rate of value of imports and exports in a given country. Exports for a country do not constitute VAT revenue as they are subject to a zero tax rate, so increasing it may have a negative impact on VAT revenue. However, an increase in exports may lead to an increase in domestic production, which will be reflected in an increase in household disposable income and a consequent increase in domestic demand. Looking at the relationship between VAT revenue and imports, imports represent a direct income for the country where final consumption takes place, as they are subject to VAT. Thus, an increase in exports represents an increase in tax revenues (Hybka 2009). This fact of a positive effect on VAT revenue is also confirmed by Hines and Desai (2005). According to Bikas and Rashkauskas (2011), unemployment can also be perceived as a macroeconomic determinant that has an impact on VAT revenue. They justified this by stating that VAT revenue is influenced by household consumption, which they refer to as the main VAT payer, depending on the level of wages.

Based on the mentioned literature and Legeida and Sologoub (2003), it can be stated that the economic situation in the country is influenced by macroeconomic determinants, namely GDP, GDP per capita, general consumption expenditure, as well as household and government consumption expenditure, exports, imports and unemployment, which form and affect the amount of VAT income, which also depends on the level of the VAT rate.

3 Material and methods

The aim of the paper was to empirically verify the impact of selected macroeconomic determinants and the level of the standard VAT rate on VAT revenues in 28 EU countries. The first part of the paper analyzed the development of the VAT rate and VAT revenues in EU countries. The second part was devoted to regression analysis, where an econometric model was compiled, which tested the impact and then was compared with the actual values of VAT revenue.

The selection of macroeconomic determinants was made on the basis of the authors' theoretical knowledge: Bogetic and Hassan (1993), Ebrill et al. (2001), Legeida and Sologoub (2003), Hybka (2009), Keen and Lockwood (2010), Bikas and Rashkauskas (2011), Onalapo et al. (2013), Godin and Hindriks (2015), Glova et al. (2018), Sarmento (2016), who in their research dealt with various determinants and factors that affect VAT revenues.

The source databases were the databases of the Statistical Office of the European Commission EUROSTAT and the Directorate General of the European Commission AMECO. All figures used in the contribution were expressed in EUR million and were annual figures from 2004 to 2018 across the 28 EU countries. The paper uses data on VAT revenues, standard VAT rates and selected macroeconomic determinants (gross domestic product, gross domestic product per capita, consumption expenditure, household and government consumption expenditure, exports, imports and unemployment). Calculations and analysis concerning the correlation coefficient and the econometric model were performed in the R programming language, in version R 3.5.0.

To determine and evaluate whether the change in the standard VAT rate also affects the amount of VAT revenue, an analysis of the development of the VAT rate and VAT revenues in EU countries for the period from 2004 to 2018 was performed. From VAT, an analysis of the development of the VAT rate and VAT revenues in EU countries for the period from 2004 to 2018 was performed.

Using Pearson's correlation coefficient, the influence of macroeconomic determinants and the VAT rate on VAT revenue was determined. The coefficient determined the tightness of the dependence between them.

The econometric model was constructed using linear regression analysis. The 28 EU countries were considered as a separate territorial unit, so the values contained in the model were expressed as an arithmetic average. The analysis showed how the amount of VAT revenue changes, whether it increases or decreases, with an increase of one unit, i.e. 1 mil. EUR of selected macroeconomic determinants and by 1 % of the VAT rate. It was also found that the constructed model determining the VAT revenue corresponds to its real value.

The constructed econometric model based on a lineally formulated model had the form:

$$RfVAT_t = \beta_0 + \beta_1 * GDP_t + \beta_2 * CE_t + \beta_3 * E_t + \beta_4 * I_t + \beta_5 * VAT_t + u_t,$$

where the explained (dependent) variable is:

RfVAT – revenue from the standard rate of value added tax,

and the explanatory (independent) variables are:

GDP – gross domestic product,

CE – general consumption expenditure,

E – export,

I – import,

VAT – standard rate of value added tax.

The compiled econometric model according to regression analysis met the assumptions of residue normality, the presence of homoskedasticity and the absence of autocorrelation. The whole compiled model turned out to be statistically significant. Therefore, the model was considered appropriate and can be said to have performed correctly. After estimating the vector of parameters $\beta = (\beta_0, \dots, \beta_5)$ a model was created:

$$y_t = -19940 + 0,1393x_1 - 0,1243x_2 - 0,04709x_3 + 0,07989x_4 + 1273x_5 + u_t$$

Based on the chosen methods, a hypothesis was established in which it is assumed that:

H1: Of the selected variables, the standard VAT rate is the one that is most significant based on the regression analysis in relation to VAT revenue.

4 Results and discussion

4.1 Analysis of the development of the VAT rate and revenue from VAT

In EU countries, the standard VAT rate applies, which must not be lower than 15 % and higher than 27 %. A table (Table. 1) showing the development and changes in the standard VAT rate in the EU member states for the period from 2004 to 2018 is a part of the annexes (Annex 1). The minimum allowed VAT rate of 15 % for the period was applied by three countries: Luxembourg until 2015, the other is Cyprus, where the minimum VAT rate applied until 2012. The last of these three countries is the United Kingdom, which applied a minimum VAT rate of 15 % in 2008-2009. A higher standard VAT rate of 25 % is applied by Sweden and Denmark, which, together with Austria, Belgium, Bulgaria and Malta, are among the countries where the VAT rate has not changed during the period under review. Hungary also had a standard VAT rate of 25 % until 2012. This year, it started applying the 27 % rate, making it the country with the highest standard VAT rate in the EU.

A table (Table. 2) recording the development and changes in VAT revenues in the EU member states for the period from 2004 to 2018 is a part of the annexes (Annex 2). The countries with the lowest revenue from VAT to state budgets from EU countries are Malta, Latvia, Estonia and Cyprus. By contrast, countries such as Germany, the United Kingdom and France have the highest VAT revenues.

The results of the analysis, which consisted of the arithmetic average of all EU countries for the period under review, showed that the standard VAT rate as well as VAT revenue were most affected by the economic crisis in 2008. The development of the standard VAT rate in 2004-2008 developed almost stably. In the following years 2008 to 2015, the standard VAT rate increased by 2.1 percentage points (from 19.5 % to 21.6 %), which was affected by fluctuations in the economies caused by the financial crisis. From 2015 to 2018, a minimal decrease of 0.1 percentage point was recorded, where this period can be described as stable after the previous period of significant changes. As for VAT revenues, it grew appropriately in the years 2004 to 2007. Due to the crisis in 2008, VAT revenues decreased compared to 2007 by 451.1 mil. EUR. A more rapid decrease in VAT revenue by 2,918 mil. EUR occurred in 2009. A year later, VAT revenue increased by 2,826.4 mil. EUR and in 2011 we can already talk about growth that exceeded the values before the crisis of 2007 by 1,071 mil. EUR. Since 2010, we can see a regular increase in average VAT revenue in EU countries.

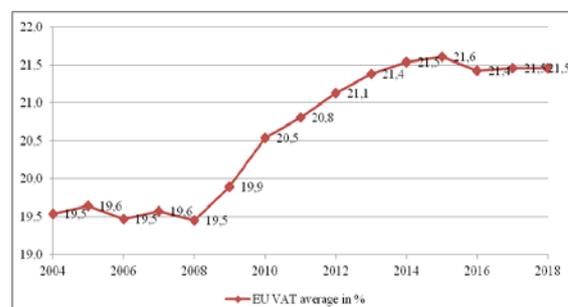


Figure. 1 Development of the average average VAT rate in EU countries for the period 2004 – 2018

Source: own processing according to EUROSTAT

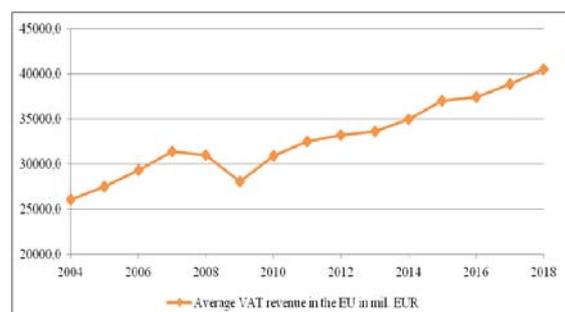


Figure. 2 Development of average VAT revenues in EU countries for the period 2004 – 2018

Source: own processing according to EUROSTAT

The crisis in 2008 had the greatest impact on VAT revenue developments in the United Kingdom, Latvia, Italy, Ireland, Spain, Estonia and Denmark, which saw a decline in VAT revenue the following year. The rest of the EU countries were affected by the decline in VAT revenue only in 2009, while in the following year they showed an increase, with the exception of Slovakia and Ireland. An exception is also Luxembourg, which did not experience a decrease in VAT revenue during the crisis until 2015. This year, the country increased its unchanged rate from 15 % to 17 % and VAT revenue decreased by 328 million EUR compared to the previous year. Between 2010 and 2018, Belgium, Estonia, Finland, France, Lithuania, Latvia and Malta saw an increase in VAT revenue. The subsequent economic growth and improvement of the economic situation in the given countries contributed to the growth of VAT revenues, which was helped by increased consumption and investment activity of the state. Others from the mentioned countries recorded only a small decrease between 2010 and 2018.

The impact of the crisis affected Greece the most, where VAT revenue fell by 1,079 million EUR from 2008 to 2009. To overcome high debts, they increased the standard VAT rate by 4 percentage points the following year and felt an increase in VAT revenue. However, in the next two years they meant a decline. Despite a visible increase from 2014 to 2018, VAT revenues did not reach pre-crisis levels. Ireland also recorded a decrease in 2008 compared to the previous year by 1,271 mil. EUR and it lasted until 2012.

In Germany and Austria, the crisis did not affect VAT revenue and it increased every year throughout the period under review.

As a result of the crisis, there was an immediate increase in the standard VAT rate in six countries in 2009 and in the following year in another nine countries.

The most significant changes in VAT rates were observed in Hungary, where in 2009 the rate increased from 20 % to 25 %. The arrival of the new government and its significant tax reform in 2012 increased the standard rate of value added tax to an incredible 27 %. The VAT rate also increased in Romania in 2010 from 19 % to 24 %. Due to the reduction of the public finance deficit and the fulfillment of the conditions for obtaining a loan from the IMF. In 2016, the VAT rate was reduced to 20 % and the following year it was reduced to 19 % and is still valid today. In 2010, there were visible changes in Greece as well. VAT rates have risen from 19 % to 23 % in order to obtain financial assistance to repay huge debts. In 2017, the VAT rate was finally adjusted from 23 % to 24 % as part of the promotion of complex reforms in parliament. The VAT rate in Latvia also increased by 3 percentage points from 18 % to 21 % in 2009. The VAT rate also increased from 16 % to 19 % in Germany in 2007, which should have allowed Germany to get below the upper limit of the state budget of a maximum of 3 % of GDP by 2007 at the latest. Spain is also hit hard by the crisis, with poor public finances and a generally weaker health forcing the government to make changes to the tax system, raising the rate in 2010 VAT from 16 % to 18 %.

4.2 Correlation coefficient

To estimate whether the selected macroeconomic determinants and the standard VAT rate affect VAT revenues, a correlation coefficient was chosen, which determined the relationship and the size of the dependence between the selected factors. The p-value has a statistically significant informative value here, by which the colored parts are marked in the table (Table. 3).

Table. 1 Correlation coefficient of dependence between VAT revenue and selected determinants in the EU

Country code	VAT	GDP	GDP per capita	Consumption expenditure	Household consumption expenditure	Government consumption expenditure	Export	Import	Unemployment rate
AT	NA	1,00	0,99	1,00	1,00	0,99	0,97	0,97	0,18
BE	NA	0,99	0,99	0,99	0,99	0,98	0,98	0,98	-0,51
BG	NA	0,97	0,97	0,98	0,97	0,97	0,96	0,98	-0,45
CY	0,43	0,88	0,85	0,77	0,83	0,42	0,73	0,90	0,09
CZ	0,85	0,97	0,97	0,97	0,97	0,96	0,98	0,97	-0,80
DE	0,78	0,97	0,98	0,97	0,97	0,97	0,97	0,96	-0,98
DK	NA	0,98	0,99	0,96	0,98	0,88	0,96	0,96	0,13
EE	0,64	0,99	0,99	0,99	0,99	0,97	0,93	0,93	-0,44
EL	-0,17	0,75	0,77	0,72	0,75	0,67	0,20	0,85	-0,58
ES	0,71	0,51	0,55	0,45	0,56	0,18	0,80	0,82	0,05
FI	0,93	0,98	0,97	0,98	0,99	0,96	0,65	0,88	0,18
FR	0,83	0,98	0,95	0,95	0,96	0,93	0,98	0,98	0,41
HR	0,71	0,92	0,95	0,89	0,89	0,86	0,97	0,92	-0,22
HU	0,63	0,94	0,95	0,86	0,86	0,84	0,91	0,90	-0,55
IE	0,01	0,56	0,64	0,59	0,65	0,42	0,36	0,39	-0,84
IT	0,73	0,96	0,94	0,91	0,94	0,73	0,94	0,94	0,52
LT	0,71	0,99	0,98	0,99	0,99	0,96	0,94	0,96	-0,23
LU	0,59	0,94	0,94	0,96	0,95	0,96	0,92	0,92	0,77
LV	0,41	0,95	0,96	0,95	0,96	0,90	0,91	0,96	-0,49
MT	NA	0,99	0,99	0,99	0,99	0,97	0,97	0,94	-0,96
NL	0,71	0,97	0,97	0,93	0,98	0,83	0,91	0,90	-0,21
PL	0,69	0,97	0,97	0,96	0,96	0,96	0,94	0,97	-0,91
PT	0,71	0,88	0,90	0,78	0,87	-0,05	0,92	0,96	-0,13
RO	0,45	0,89	0,89	0,87	0,88	0,80	0,86	0,90	-0,58
SE	NA	0,99	0,98	0,99	0,99	0,99	0,96	0,97	-0,14
SI	0,74	0,99	0,99	0,91	0,92	0,87	0,97	0,98	0,04
SK	0,78	0,97	0,97	0,96	0,96	0,97	0,96	0,97	-0,82
UK	0,83	0,95	0,86	0,96	0,96	0,89	0,95	0,96	-0,46
EU average	0,85	0,99	0,99	0,99	0,98	0,95	0,99	0,99	-0,06

Source: own processing according to EUROSTAT

It is clear from the table (Tab. 3) that the unemployment rate indicator shows negative values, which indicates a negative correlation and means that an increase in the unemployment rate affects the decline in VAT revenues (negative relationship). The exceptions are Italy and Luxembourg, where a positive relationship applies. For all other indicators, plus values came out, which shows a positive correlation, and thus when the value of the indicator of the independent variable increases, there is always an increase in the dependent variable, i.e. our VAT revenue.

The EU average, which expresses a separate territorial unit, has the strongest relationship, i.e. very close correlation (correlation coefficient 0.99) achieved for the indicators GDP, GDP per capita, consumption expenditure, exports (exports) and imports (imports). Another strong relationship (correlation coefficient 0.98 and 0.95) exists between the indicators household consumption expenditure and government consumption expenditure. The medium close correlation (correlation coefficient 0.85) is represented by the indicator of the standard VAT rate. The relationship between the indicators VAT revenue and the unemployment rate expresses a negative relationship and at the correlation coefficient -0.06 it represents practically no correlation.

The strongest relationship with the value of the correlation coefficient of 0.99 - 0.96 from individual EU countries was found in Austria, Belgium, Bulgaria, the Czech Republic, Germany, Sweden and Slovakia. However, most countries

achieved a strong relationship (correlation coefficient values above 0.90) in the indicators of imports (24 countries), GDP, GDP per capita and exports (22 countries), consumption expenditure, household consumption expenditure (20 countries) and government expenditure. consumption (15 countries).

On the contrary, the weakest and according to the p-value insignificant relationship was achieved in 17 countries with the unemployment rate indicator. Also for the indicator, government consumption expenditure was found in the countries of Cyprus, Spain, Ireland and Portugal. If we evaluate the countries separately, Spain shows insignificant values in terms of GDP, consumption expenditure and government consumption. Ireland, on the other hand, spends on government consumption, imports and exports.

Macroeconomic determinants of GDP, consumption expenditures, exports, imports and the standard VAT rate were selected for the econometric model expressing VAT revenue on the basis of calculated average values of EU countries.

4.3 Regression analysis

The results of the econometric model using linear regression analysis are contained in the table (Table. 4). The model expresses the relationship between the VAT revenue rate and the vector of regressors, which are macroeconomic determinants and the standard VAT rate.

Table. 2 Overview of the results of the regression analysis of the VAT revenue model

	Estimation of the parameter β	Estimation of standard deviation	p-value	p-value for the model	Coefficient of determination	Corrected coefficient of determination
RfVAT	-19940	6804	0,016745	4,37E-13	0,9991	0,9985
GDP	0,13930	0,02219	0,000145			
CE	-0,12430	0,02337	0,000480			
E	-0,04709	0,03794	0,245871			
I	0,07989	0,02939	0,023679			
VAT	1273	325	0,003534			

Source: own processing

Based on testing of the model as a whole, it was found that at least one regression coefficient is non-zero, i.e. is statistically significant because the resulting p-value = 4.37E-13 for the model is lower than the determined significance level $\alpha = 0.05$. When testing the significance of the estimated regression coefficients, the p-value of all regressors except exports is lower than the specified level of significance, which means that they are statistically significant.

From the output of the analysis it is clear that the coefficient $\beta_0 = -19940$ is an estimate of the level constant, which says that the amount of VAT revenue would be -19,940 mil. EUR if the variables in the model were equal to zero. This means that if the VAT rate were not applied, the state treasury would not receive revenue from this tax collected from individual determinants in the model, and so the EU as a separate territorial unit would lose this part of the money, i.e. 19,940 mil. EUR. Estimates of the regression coefficients β_1 , β_2 , β_3 , β_4 and β_5 are other values in the model, which express that if a variable in the model changes by one mil. EUR, the value depends on the value of the estimated regression coefficient. GDP is the first independent variable in the compiled model and represents the statistically most significant determinant according to the p-value of 0.000145. The regression coefficient is 0.13930, which indicates a positive relationship to VAT revenue, which is also mentioned by Keen and Lockwood (2010). The coefficient says that if GDP increases by 1 mil. EUR, so the VAT revenue will increase by EUR 139,300. The second variable is consumption expenditure, which is also the second most statistically significant according to the p-value of 0.000480. For the given variable, a regression coefficient of -0.12430 was issued, which speaks of a negative effect

on VAT revenue, and thus if consumption expenditures increase by 1 mil. EUR, so the VAT revenue will decrease by EUR 124,300. The third in the model is the export, which according to the p-value of 0.245871 is statistically insignificant with the value of the regression coefficient of -0.04709. Assuming statistical significance, it would have a negative relationship to VAT revenue, and thus with an increase in exports of 1 mil. EUR, VAT revenue would decrease by EUR 47 090. This means that all goods exported from the country are subject to taxation in the country to which they are imported, and thus in the exporting country it would represent a decrease in VAT revenue by the value of the coefficient. Another variable in the model is the import, which is statistically significant according to the achieved p-value of 0.023679. According to the regression coefficient with a value of 0.07989, it expresses a positive relationship, and thus with an increase in imports by 1 mil. EUR, VAT revenue will also increase by EUR 79,890. Hines and Desai (2005), Hybka (2009) and Fila et al. (2020) came to the same view, which means that all goods are subject to taxation on importation into the country of importation, which is a separate EU territorial unit. The last variable is the standard VAT rate, at which we can notice the statistical significance according to the p-value at the level of 0.003534, the significance of the VAT rate was also published by Onaolapo et al. (2013). Also the regression coefficient indicating a positive relationship with the value of 1273. The coefficient says that if the VAT rate is increased by 1 %, the VAT revenue will increase by 1,273 mil. EUR. This positive relationship was also confirmed by Bogetic and Hassan (1993).

The quality of the model adjustment according to the coefficient of determination = 0.9991 means that approximately 99.91 % of the total variability of the dependent variable, i.e. VAT revenue is explained by the chosen model and the remaining variability is caused by the element of chance and other factors.

By testing the normality of the residues by the Shapir-Wilk test, the p-value was 0.9999 higher than the level of significance, therefore the residues are from the normal distribution. When testing the heteroskedasticity of the Breusch-Pagan model, the resulting p-value was 0.3303, and thus higher than the significance level $\alpha = 0.05$, from which it is assumed that the data are not heteroskedastic. The Breusch-Godfrey test was used to test the autocorrelation in the model, where the resulting p-value of 0.1227 was greater than the level of significance, making the model suitable because the autocorrelation was not confirmed. The presence of multicollinearity in the model was confirmed, but we chose to ignore it.

To compile the VAT revenue model and to determine the relationship, all five selected variables were also used with exports, so as not to reduce the significance of the model as a whole, which explains 99.91 % of the VAT revenue variability. How the compiled model corresponds to the actual development of VAT revenue and calculated, shows the following graph (Figure. 3), which with selected variables with 0.32 % deviation characterizes VAT revenue for the period from 2004 to 2018. The calculated model would be based on regression analysis could be used to determine VAT revenue on the basis of selected macroeconomic determinants and the standard VAT rate.

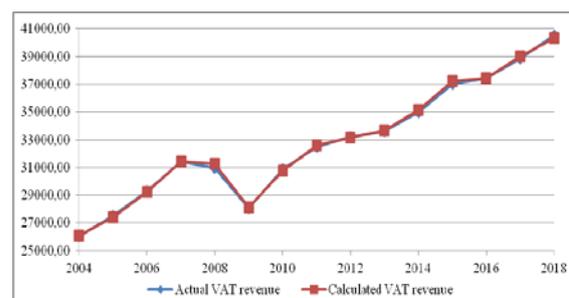


Figure. 3 Actual and calculated values of VAT revenue in mil. EUR for the period 2004-2018

Source: own processing

5 Conclusion

In EU countries, the correct setting of the VAT rate, which is in the hands of individual governments, plays an important role. Revenues from this tax are important revenues to the state treasury. However, the amount of this VAT revenue is not only affected by the level of the VAT rate itself but also by other factors. In the analysis of the development of the standard VAT rate and VAT revenues, countries such as Sweden, Denmark, Austria, Belgium, Bulgaria and Malta are among those in which the standard VAT rate has not changed throughout the period under review. Of these countries, in Belgium and Malta, VAT revenue increased annually, except for 2009. At a constant rate of 20 %, revenue grew only in Austria. On this basis, it can be concluded that the VAT rate is not a decisive factor influencing the amount of VAT revenue in the six countries concerned. This analysis already indicated a failure to confirm the established hypothesis. Based on the calculated positive correlation coefficients, an econometric model was compiled, where all macroeconomic determinants except exports proved to be statistically significant using regression analysis. With an increase in individual determinants by 1 mil. EUR proved to be the most influential factor of GDP influencing VAT revenue, which was also the most statistically significant, which did not confirm the established hypothesis about the significance of the VAT rate. The constructed econometric model with selected variables explains 99.91 % of the variability of VAT revenue and, when compared, almost faithfully copies the actual VAT revenue. In conclusion, it can be stated that the standard VAT rate and selected macroeconomic determinants in the constructed model affect the amount of VAT revenue.

Literature:

1. AMECO.: Macro-economic database AMECO. 2019. [Online] Available: https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/macro-economic-database-ameco/download-annual-data-set-macro-economic-database-ameco_en (28 december 2019).
2. Baskaran, T., Lopes da Fonseca, M.: *The Economics and Empirics of Tax Competition: A Survey and Lessons for the EU*. Erasmus Law Review. 2014. [Online] Available: <http://dx.doi.org/10.5553/elr.000015> (28 december 2019).
3. Bendikienė, D., Šaparnis, G.: *Changes in the Imposition of Value Added Tax in Lithuania (1994-2004)*. Engineering Economics. 2006, 47(2): 23-29.
4. Bikas, E., Rashkauskas, J.: *Value added tax dimension: the case of Lithuania*. Ekonomika. 2010, 90(1): 22-38.
5. Bogetic, Z., Hassan, F.: *Determinants of value-added tax revenue*. Policy research. Working paper, WPS 1203. October 1993.
6. Brederode, R.: *Third-party risks and liabilities in case of VAT fraud in the EU*. International tax journal. 2008, 19: 31-32.
7. Cnossen, S.: *Taxing value added: the OECD experience*. International VAT monitor. Amsterdam. May 1990, (5): 2-16.
8. Dharmapala, D.: *What do we know about base erosion and profit shifting? A review of the empirical literature*. Coase-sandor institute for law & economics. Working paper (702). September 2014.
9. Ebrill, L., Keen, M., Bodin, J-P., Summers, V.: *The modern VAT*. International monetary fund. Washington, DC. 2001.
10. EUROSTAT.: Main national accounts tax aggregates. 2019. [Online] Available: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_10a_taxag&lang=en (29 december 2019).
11. Fila, M., Levicky, M., Mura, L., Maros, M., Korenkova, M.: *Innovations for Business Management: Motivation and Barriers*. Marketing and Management of Innovations. 2020, 4, 266-278. <http://doi.org/10.21272/mmi.2020.4-22>.
12. Glova, J., Mrazkova, S., Dancakova, D.: *Measurement of Intangibles and Knowledge: An Empirical Evidence*. Ad Alta: Journal of Interdisciplinary Research. 2018, 8(1): 76-80.
13. Glova, J., Dancakova, D., Suleimenova, Sh.: *Managerial Aspect of Intangibles: Own Development or External Purchased Intangible Assets - What Does Really Count?* Polish Journal of Management Studies. 2018, 1(2): 84-93.
14. Glova, J., Mrazkova, S.: *Impact of Intangibles on Firm Value: An Empirical Evidence from European Public Companies*. EKONOMICKY CASOPIS. 2018, 66(7): 665-680.
15. Godin, M., Hindriks, J.: *A Review of critical issues on tax design and tax administration in a global economy and developing countries*. Center for operations research and econometrics, Core discussion paper (28). June 2015.
16. Hines, J., Desai, M.: *Value-added taxes and international trades: The evidence*. The law and economics workshop. November 2005.
17. Hodzic, S., Celebi, H.: *Value-added tax and its efficiency: EU-28 and Turkey*. UTMS Journal of economics. 2017, 8(2): 79-90.
18. Hybka, M.M.: *VAT collection efficiency in Poland before and after accession to the European Union a comparative analysis*. Ekonomika. 2009, 7-18 p. ISSN 1392-1258.
19. Keen, M., Lockwood, B.: *Is the VAT a Money machine*. National Tax Journal. 2006, (4): 910-924.
20. Keen, M., Lockwood, B.: *The value added tax: Its causes and consequences*. Journal of development economics. 2010, 92(2): 138-151.
21. Keen, M., Smith, S.: *VAT fraud and evasion: What do we know, and what can be done?* International monetary fund. Working paper. February 2007.
22. Legeida, N., Sologoub, D.: *Modeling Value Added Tax (VAT) Revenues in a Transition Economy: Case of Ukraine*. Institute for economic research and policy consulting. Working paper. 2003, (22): 1-21.
23. Mach, P.: *VAT rates and their impact on business and tax revenue*. European research studies journal. 2018, 21(1): 144-152.
24. MFSR.: *Dane a daňová medzera*. 2019. [Online] Available: <https://www.mfsr.sk/sk/financie/institut-financnej-politiky/publikacie-ifp/manualy/23-danova-medzera-dph.html/> (10 april 2020).
25. Mura, L., Slezciak, J.: *Innovation and Entrepreneurship Network*. CERS 2014: 5th Central European Conference in Regional Science. International Conference Proceedings. 2015, 643-651 p. ISBN 978-80-553-2015-1.
26. Onaolapo, A. A-R., Aworemi, R. J., Ajala, O. A.: *Assessment of value added tax and its effects on revenue generation in Nigeria*. International journal of business and social science. 2013, 4(1): 220-225.
27. Sarmento, J.: *The determinants of value added tax revenues in the European union*. The European journal of management studies. 2016, 21(2): 79-99.
28. Simonidesová, J., Feranecová, A.: *Dane podnikateľských subjektov*. Vydavateľstvo EKONÓM. Bratislava. 2017, ISBN 978-80-225-4402-3.
29. Slemrod, J.: *The truth about taxes and economic growth*. Challenge. 2003, 46(1): 5-14.
30. Tumpach, M., Uzik, J., Juhaszova, Z.: *Irregularities in accounting for provision in Slovakia*. Conference: 7th International Scientific Conference on Managing and Modelling of Financial Risks Location. 2014, 824-831 p.

Primary Paper Section: A

Secondary Paper Section: AH

Annexes

Annex 1

Table. 3 Development of VAT in EU countries for the period 2004 – 2018

Country	Standard rate of value added tax in %							
	2004	2005	2006	2007	2008	2009	2010	2011
Austria	20	20	20	20	20	20	20	20
Belgium	21	21	21	21	21	21	21	21
Bulgaria	20	20	20	20	20	20	20	20
Cyprus	15	15	15	15	15	15	15	15
Czech Republic	19	19	19	19	19	19	20	20
Germany	16	16	16	19	19	19	19	19
Denmark	25	25	25	25	25	25	25	25
Estonia	18	18	18	18	18	20	20	20
Greece	18	19	19	19	19	19	23	23
Spain	16	16	16	16	16	16	18	18
Finland	22	22	22	22	22	22	23	23
France	19,6	19,6	19,6	19,6	19,6	19,6	19,6	19,6
Croatia	22	22	22	22	22	23	23	23
Hungary	25	25	20	20	20	25	25	25
Ireland	21	21	21	21	21	21,5	21	21
Italy	20	20	20	20	20	20	20	20
Lithuania	18	18	18	18	18	19	21	21
Luxembourg	15	15	15	15	15	15	15	15
Latvia	18	18	18	18	18	21	21	22
Malta	18	18	18	18	18	18	18	18
Netherlands	19	19	19	19	19	19	19	19
Poland	22	22	22	22	22	22	22	23
Portugal	19	21	21	21	20	20	21	23
Romania	19	19	19	19	19	19	24	24
Sweden	25	25	25	25	25	25	25	25
Slovenia	20	20	20	20	20	20	20	20
Slovakia	19	19	19	19	19	19	19	20
United Kingdom	17,5	17,5	17,5	17,5	15	15	17,5	20
EU average	19,5	19,6	19,5	19,6	19,5	19,9	20,5	20,8

Country	Standard rate of value added tax in %						
	2012	2013	2014	2015	2016	2017	2018
Austria	20	20	20	20	20	20	20
Belgium	21	21	21	21	21	21	21
Bulgaria	20	20	20	20	20	20	20
Cyprus	17	18	19	19	19	19	19
Czech Republic	20	21	21	21	21	21	21
Germany	19	19	19	19	19	19	19
Denmark	25	25	25	25	25	25	25
Estonia	20	20	20	20	20	20	20
Greece	23	23	23	23	23	24	24
Spain	18	21	21	21	20	21	21
Finland	23	24	24	24	24	24	24
France	19,6	19,6	20	20	20	20	20
Croatia	25	25	25	25	25	25	25
Hungary	27	27	27	27	27	27	27
Ireland	23	23	23	23	23	23	23
Italy	21	21	22	22	22	22	22
Lithuania	21	21	21	21	21	21	21
Luxembourg	15	15	15	17	17	17	17
Latvia	22	21	21	21	21	21	21
Malta	18	18	18	18	18	18	18
Netherlands	19	21	21	21	21	21	21
Poland	23	23	23	23	23	23	23
Portugal	23	23	23	23	23	23	23
Romania	24	24	24	24	20	19	19
Sweden	25	25	25	25	25	25	25
Slovenia	20	20	22	22	22	22	22
Slovakia	20	20	20	20	20	20	20
United Kingdom	20	20	20	20	20	20	20
EU average	21,1	21,4	21,5	21,6	21,4	21,5	21,5

Source: own processing according to EUROSTAT

Annex 2

Table. 4 Development and changes in VAT revenues in EU countries for the period 2004 – 2018

Country	Revenues from VAT in mil. EUR				
	2004	2005	2006	2007	2008
Austria	18545,3	19368,4	19689,1	20922,2	21884,3
Belgium	20404,3	21533,3	22849,8	24140,1	24746,1
Bulgaria	2010,6	2377,5	2834,8	3190,2	3862,2
Cyprus	1053,5	1241,9	1418,9	1627,8	1816,2
Czech Republic	6416,2	7223,1	7541	8365,9	10437,2
Germany	137445	139801	147137	170067	175869
Denmark	18957	20753,9	22380,2	23439,6	23319,7
Estonia	805,8	908	1214,9	1423,2	1287,7
Greece	12578	13398	14755	16511	16978
Spain	51272	57716	62365	62743	52347
Finland	13010	13748	14537	15207	15658
France	120224	126624	131693	136542	137737
Croatia	3977	4362,8	4828,5	5207	5674
Hungary	7278,3	7484,6	6812,8	8009,8	8224,1
Ireland	10986	12373	13746	14355	13084
Italy	81515	85324	92221	95567	93698
Lithuania	1175,4	1488,2	1825,6	2330,4	2593
Luxembourg	1656,9	1850,4	1897,5	2279,9	2384,9
Latvia	779,4	1011,2	1373,6	1733,2	1538,1
Malta	333,6	396,9	409,8	420	458,4
Netherlands	35587	36950	39888	41952	43308
Poland	14633,3	18837,4	22126,9	25860,4	29007,1
Portugal	11568,7	13001	13763,6	14333,4	14424
Romania	4074,7	6439,3	7740,8	10078,7	11036,3
Sweden	25642,1	26739,6	28507,3	30549,4	30941
Slovenia	2316,8	2472,9	2648,3	2923	3167,2
Slovakia	2639,8	3028,1	3320,3	3699	4453,5
United Kingdom	121807,7	123764,3	130570,8	136405,9	117319,3
EU average	26024,8	27507,7	29289,2	31424,4	30973,3

Country	Revenues from VAT in mil. EUR				
	2009	2010	2011	2012	2013
Austria	22105,4	22682,3	23393,5	24506,5	24894,5
Belgium	24390,7	25628,4	26504,4	27420,2	27738,1
Bulgaria	3156	3299,1	3361,6	3768,5	3898,1
Cyprus	1545,6	1597,4	1516,9	1577,5	1403
Czech Republic	9783,5	10419,9	11245,8	11376,8	11694,5
Germany	177701	180213	189910	194034	197005
Denmark	22498,6	23039,6	23682,4	24398,9	24320,3
Estonia	1224	1257,2	1363	1508	1557,9
Greece	14879	15958	15021	13713	12593
Spain	36786	55318	54101	55021	60314
Finland	15176	15533	17315	17987	18888
France	130303	135578	140552	142527	144490
Croatia	5051,8	5161,5	5072	5402,7	5508,4
Hungary	7820,2	8442	8516,5	9084,1	9073,2
Ireland	10324	10067	9755	10219	10372
Italy	86231	97042	98257	95768	93571
Lithuania	1960,8	2180,5	2443,8	2520,8	2611,2
Luxembourg	2469,2	2608,2	2890,7	3171	3427,7
Latvia	1109,2	1192,2	1367,5	1582,6	1693,4
Malta	456,8	477,1	520,1	540	582,2
Netherlands	41267	41840	41900	41777	42408
Poland	23006,3	27465,6	29764,4	27783,4	27780,1
Portugal	11971,2	13527,1	14264,9	13994,9	13709,7
Romania	7852,3	9493,9	11411,5	11003,1	11709,6
Sweden	28199,4	33825,4	36630,9	37834	39047,9
Slovenia	2850,8	2926	2995,2	2887,7	3045,5
Slovakia	4221,3	4182,1	4710,9	4327,7	4696,1
United Kingdom	91209,3	113733,3	130733,5	143622,3	143242,4
EU average	28055,3	30881,7	32471,4	33191,3	33617

Country	Revenues from VAT in mil. EUR				
	2014	2015	2016	2017	2018
Austria	25385,5	26247,3	27301,4	28304,3	29323,4
Belgium	27804,3	27951,5	29179,2	30254,7	31545,1
Bulgaria	3809,8	4059,4	4417,1	4663,7	5096,5
Cyprus	1512	1516,7	1663,6	1851,4	2088,6
Czech Republic	11602,4	12217,2	13091,5	14720,7	15929,3
Germany	203081	211616	218779	226582	235130
Denmark	24949,6	25671,9	26769,7	27965,6	29121,2
Estonia	1711,1	1873	1975,1	2148,7	2330,7
Greece	12676	12885	14333	14642	15288
Spain	64091	69294	71752	75599	79264
Finland	18948	18974	19694	20404	21364
France	148454	151680	154490	161932	168902
Croatia	5455,2	5698,5	5992,4	6464,7	6945,8
Hungary	9754	10675,9	10595,4	11729,2	12949,7
Ireland	11527	11831	12603	13060	14158
Italy	96567	100345	102086	107576	109362
Lithuania	2764,4	2889	3027,6	3310,4	3522,2
Luxembourg	3746,8	3418,8	3423,2	3435	3729,5
Latvia	1787,3	1876,3	2032	2163,7	2449,1
Malta	642,2	673,3	711,6	810,2	919,7
Netherlands	42951	44746	47849	49833	52619
Poland	29317	30074,8	30838,4	36329,8	40410,7
Portugal	14681,6	15367,9	15767,1	16809,5	17865,4
Romania	11496,3	12939,2	10968,4	11650,5	12889,9
Sweden	38845,9	40501,4	42770,2	44115,1	43433,1
Slovenia	3154,8	3219,7	3318,5	3481,7	3765,3
Slovakia	5021,1	5422,5	5423,6	5918,7	6319,3
United Kingdom	158347,4	183164,3	167827,2	162723,7	168688
EU average	35003	37029,6	37452,8	38874,3	40550,3

Source: own processing according to EUROSTAT

FRAGMENTS OF JUDAISM IN THE MEMOIR LITERATURE OF EASTERN SLOVAKIA

^aSYLVIA HREŠKOVÁ

Faculty of Central European Studies, Constantine the
Philosopher University,
Dražovská 4, 949 74 Nitra
email: ^asylvia.dzurko.hreskova@ukf.sk

This work was supported by research project UGA "Jewish culture in the Zemplín region" based on the contract n. X/6/2020.

Abstract: The study focuses on mapping the Jewish issues in eastern Slovakia. It specifies the Zemplín region and area definition of this region. Through works of art - literature it will focus on the phenomenon of antiquity of Jewish culture. The topic of the Holocaust is captured in the publication *Fragments of Judaism* (Fragmenty židovstva), in the book of interview with Jaroslava Marcinekovej *The Last Jew from the Uličská Valley* (Posledná Židovka z Uličskej doliny), in the book by Juraj Šeb *Escape from Hell* (Útek z pekla) or in the novel by Andrey Coddington *The Jewess* (Židovka). Works are inspired by authentic testimonies, and that is why every effort in the field of history has its merits and is the center of attention in the elaboration of contribution, depicting a period of fascist-like totalitarianism that should never be forgotten.

Keywords: Escape from hell, Fragments of Judaism, Jewish culture., The Jewess, The last Jew from Uličská valley, Zemplín region

1 Introduction

Slovakia's position in Central Europe, with its geographical character, has always formed a connection between different cultures, ethnicities and nationalities. It excels in rich cultural heritage and historical tradition. The crossroads of the influences of different cultures and religions is also reflected in the individual regions of Slovakia. Jewish history is also a history of culture and spirit. *Central Europe is often assessed through the ethnic principle and participation of all these ethnicities in the final looks of this spiritual space. In such way the historic experience projects into the conception of Central Europe and the fellowship of the Jews with the Central European region is accentuated despite of the otherness*" (Vargová, 2011, p. 95). The otherness of the Jews created negative stereotypes. And it was towards the Jewish minority that led to the hateful, xenophobic manifestations that culminated during the Holocaust (Gallik, 2018, p. 84). Recently, we have seen an increased interest in works with the issue of Judaism. Manifestations of extremism are the reasons why we are currently commemorating those historical events that had a negative impact on society (Adamická, 2019, p. 7). There are historical mentions of Jewish communities in the Slovak regions. The Zemplín region is no exception. Zemplín is known for any multi-ethnic composition of the population and confessional mixing. The study describes the Jewish destinies of people who were born, lived or worked in this easternmost region of Slovakia for a period of time. The tragic fate of the Jews, the horrors of the Holocaust or the story of their stay in the camp became the inspiration for various types of art. Especially for literature and film. These works are a special documentary about the trauma that afflicted the Jews. Nevertheless, the artists' efforts have signed an authentic depiction of the "bloodshed" and "nihilization of the human nature" of the extent of events and suffering that cannot be mediated, depicted or expressed (Vargová, 2011, p. 59). However, the study further deals with the characteristics of the territory and at the same time goes through literary works with the given topic, trying to better penetrate into the destinies of people who either have their personal or mediated experience with the horrors of the Holocaust. The topic of Jewish issues is still relevant and should not be missing in the consciousness of society but also of each of us.

2 Materials and Methods

The study analyses and interprets the knowledge on the basis of scientific literature and available information on Jewish issues in the Zemplín region. It brings a mapping of events, destinies, holidays, traditions, but also religions in an ethnically mixed area such as Zemplín. The contribution is based on selected

works that deal with Jewish issues, the fates of people who experienced the horrors of the Holocaust personally or mediate.

The article is focused on recognising, clarifying and deepening knowledge of Jewish issues. With the description and characteristics of a specific one part - the Zemplín region, a more precise focus on the given locality and the peculiarities of the region. With the help of general knowledge, we proceed to the specific one in the given subpages.

The analysis of works and documentation of Jewish destinies and Jewish issues, which is still relevant, is important. Through the interpretation of selected specific works of memoir literature, it takes place on a given issue. Due to the unavailability of translation literature, the author of the article is also the author of translations of cited texts.

In the introduction, we will focus on the definition of the Zemplín region and its geographical characteristics. We focus on selected Jewish representatives who come from the easternmost region of Slovakia. We will describe the life of the Jewish physician Armin Hoffmann - the first discoverer of penicillin, Arnošt Rosin, who managed to escape from Auschwitz, the fate of the last Jew from Uličská valley and Edita Grosmanová - the wife of the author of the short story and screenplay for the film *The Shop on Main Street* (Obchod na korze) by Ladislav Grosman. Through the interpretation of the autobiographical book *The Jewess* (Židovka), we will point out the story of the Slovak Jewish family in the times of communism and the journey of the courageous woman Sofia Maniševičová for political and religious freedom.

3 Definition of the territory of the Zemplín region

The term region has its representation in various scientific disciplines. According to regionalists, the starting point for defining a region is its geographical significance. The region can thus be understood in the narrower sense as a certain territorial unit connected with a given space. "A region represents a spatial unit with specific characteristics, it is characterized by internal similarity and external difference from other neighboring territorial units" (Ivaničková, 1998, p. 62).

The easternmost region of Slovakia is Zemplín. Eastern Slovakia is geographically highly fragmented and diverse in terms of ethnicity. It forms a liaison area of several cultural currents, thus playing an important role as a mediator of many phenomena and values of folk, material and spiritual culture (Podolák et al., 1985, p. 5).

In terms of cultural history, the Zemplín region represents an important area where, since the end of the 14th century, colonization, which historians call "Wallachian colonization" or "colonization on Wallachian law",¹ has passed from the Ukrainian and Romanian Carpathian regions to the mountainous regions of Slovakia. Later in the 15th - 17th century, this colonization affected the character of settlements in eastern and northern Slovakia. It also affected the ethnic structure of eastern Slovakia and left significant traces in economic, social, cultural and linguistic development (Podolák et al., 1985, p. 10).

¹Wallachian colonization was the result of the efforts of landowners of today's northeastern Slovakia, which at the beginning of the 15th century formed part of the Zemplín capital, to economically raise uninhabited, mostly forested areas, providing certain concessions and benefits to recruited settlers in establishing new settlements and villages. These settlers, or immigrants whose job was to "colonize" the Zemplín area, were, like other villagers in Wallachian law, characterized in two respects: employment dominated by sheep pastoralism and logging, and religion, as they professed Eastern Orthodox. - a form of Christianity. It is assumed that the first waves of immigrants on Wallachian law came to the territory of today's northeastern Slovakia from the Wallachian region in northern Romania (from which the name of the settlement process is derived), later in other waves of immigration probably prevailed population from today's Ukraine. To Wallachian colonization. Compare: ULIČNÝ, F. : History of the settlement of Zemplín County. Michalovce. 2000, p. 700-707.

3.1 Geographical characteristics

The Zemplín region is divided into two self-governing regions - Horný and Dolný Zemplín. Horný Zemplín is a part of the Prešov self-governing region, located in the north-eastern part of Slovakia. These include today's administrative areas of the districts: Humenné, Medzilaborce, Snina, Stropkov, Vranov nad Topľou. Horný Zemplín borders Poland with the north, Šariš from the west, the eastern side forms the border with Ukraine and in the south it leads to the Dolný Zemplín region.²

The territory of Horný Zemplín is surrounded by Bukovské vrchy and Laborecká vrchovina. Bukovské vrchy is the most attractive part of the region, where the Poloniny National Park is located. Poloniny is the easternmost Slovak national park, reaching as far as the Ukrainian and Polish borders. The highest peak of the national park – Kremeneč (1,210 m above sea level) connects all three borders. In addition to the fact that Kremeneč is the highest point of the protected area and the elevation on which the borders of the three countries (Slovakia, Poland, Ukraine) stretch, it is also the easternmost place where every Slovak day begins (Buraľová, 2015, p. 4).

The most important landmark in the Humenné district, which forms part of Horný Zemplín, is the chateau, which houses the Vihorlat Museum. It is a regional museum of patriotic character. The art-historical exhibition focuses on the culture of the nobility from the Renaissance to the 20th century. The natural science exposition focuses on the natural conditions of the Humenné district and the permanent exhibition "From the History of the Roma in Slovakia" presents a cross-section of the history of the Roma ethnic group in Slovakia.³

There is also an exhibition of folk architecture and housing. In the years 1974-1982, the Humenský open-air museum was built, which was opened to the public in 1984. The relatively typical buildings from the region of northeastern Slovakia - 14 objects of folk architecture and one sacral building - were concentrated here in a relatively small area. These buildings bear the characteristics of architecture from the Eastern Carpathian region.⁴

Another important tourist center of the Horný Zemplín region is the Domaša dam. Horný Zemplín is also known for the Andy Warhol Museum of Modern Art, which was established on September 1, 1991 as the first in the world and still the only one in Europe. In addition to exhibition activities, the museum is dominated by presentation, educational, consulting and scientific research activities in the field of fine arts.⁵

Artist Andy Warhol claims to come from nowhere. However, his parents had to come from somewhere. It was the village Miková in the district of Stropkov. The inhabitants of the village are united by one and it is that they are of Ruthenian origin. And so the origins of Andy Warhol are more than clear. Parents Júlia Varcholová, born Zavacká and Andrej Varchola, emigrated from a small village in northeastern Slovakia to the USA. Andy Warhol became famous in the world as a revolutionary of a new approach to the philosophy of art and its perception.⁶

Dolný Zemplín consists of the districts of Sobrance, Trebišov and Michalovce. It is bordered on the north by Horný Zemplín and on the west by the Košice region. In the east it forms the border with Ukraine and the southern side represents the border with the Republic of Hungary. It spreads in the East Slovakian lowlands, surrounded by the Western Carpathians, Vihorlatské vrchy with a lookout Sninský kameň.⁷

Zemplínska Šírava is considered to be the tourist center of Dolný Zemplín, which is also called the Slovak Sea due to its size. In

the district of Trebišov in the south of Dolný Zemplín, there is the Tokaj wine-growing region, where the world-famous Tokaj wine is produced.⁸

There are also many museums in this area – Zemplín Museum in Michalovce, P. Horov Literary Museum in Bánovce nad Ondavou, Homeland Studies Museum in Trebišov, Municipal Museum in Veľké Kapušany, Guitar Museum in Sobrance (the only one in Europe), Homeland Studies Museum in Kráľovský Chlmec and the Salt House in Veľké Trakany.⁹

Horný and Dolný Zemplín are decorated, among other things, by a number of wooden churches, which are part of the cultural tradition of the Eastern Church ceremony with high artistic and historical value.¹⁰

4 Fragments of Judaism in the memoir literature of eastern Slovakia

Armin Hoffmann. Arnost Rosin. Gizela Lipovská – real heroes of Judaism.

Knowing the history is important, but knowing the fates of individual Jewish heroes is important in order to understand the unwavering will to survive under certain circumstances.

The book *Fragments of Judaism* (Fragmenty židovstva) not only refers to the history of Snina and its surroundings, but above all offers us testimony about specific human - more precise Jewish destinies. It tells of the tragedy and heroism of individuals, as well as of the entire local Jewish community. The sad fact is that today the region, where a large Jewish community lived, is practically a "Judenfrie" (free of Jews). Historical data gives us a different picture. In the recent past, the town had about 400 Jewish inhabitants and another about 1,100 lived in nearby villages. "The resulting number of 1,500 Jews is only slightly lower than the number of people currently professed to be Jewish in Slovakia." While this figure may serve to better understand the extent and subsequent tragedy that struck the Jewish community during the Holocaust. Thanks to this, many may realize what the Holocaust is preparing not only for Snina and its surroundings, but also for the rest of Slovakia and other states in Nazi-occupied Europe (Marcinekova, Stern, Šmigel, Novák, Levický, 2018, p.3).

4.1 Armin Hoffmann - the real discoverer of penicillin?

Armin was born on March 26, 1874, the fifth of eight children of Gabriel Hoffmann and his wife Júlia, born Strauss. Parents were involved in the timber trade, which was the usual way of doing business for many Jews in the Austro-Hungarian monarchy in times of construction and industrial boom (Marcinekova, Stern, Šmigel, Novák, Levický, 2018, p.6).

Armin grew up in the liberal atmosphere of the local Jewish community, which a few years before his birth leaned towards the reformed so-called neologist (a congress of representatives of all Hungarian Jewish communities took place in Budapest in 1868-1869. "The main conclusion of the congress was the division of Jewish communities into three main directions: orthodox, neological and status quo ante"). (ibid., p.7). He studied at the grammar school in Žilina and decided to continue his medical studies at the University of Budapest. At the beginning of his career, he worked as a general practitioner in today's Hungarian village of Forov, located in the Borsod-Abaúj-Zemplén County in the Encs district. From 1908 Hoffmann worked as a secondary doctor in the local hospital of St. Elizabeth. Exactly in the same year in Great Britain Alexander Fleming (Scottish biologist, pharmacologist and discoverer, his most famous success was the discovery of the enzyme lysozyme in 1922 and the isolation of the antibiotic penicillin from the fungus *Penicillium notatum*, for which he won the Nobel Prize) passed final medical examinations (ibid., p.10).

²<http://www.regionzemplin.sk/o-regione-zemplin/>

³<http://www.regionzemplin.sk/o-regione-zemplin/>

⁴<http://www.regionzemplin.sk/o-regione-zemplin/>

⁵<http://www.regionzemplin.sk/o-regione-zemplin/>

⁶<https://www.muzeumaw.sk/clanok/rodokmen-andyho-warhola>

⁷<http://www.regionzemplin.sk/o-regione-zemplin/>

⁸<http://www.regionzemplin.sk/o-regione-zemplin/>

⁹<http://www.regionzemplin.sk/o-regione-zemplin/>

¹⁰<http://www.regionzemplin.sk/o-regione-zemplin/>

Hoffmann was the only doctor in the district, which brought to him enormous professional workload and physical exertion. He was a surgeon, internist, dentist and pharmacist in one person. In the treatment of diseases, he applied mostly traditional, often even medieval methods. He thus became a key pioneer of modern treatment and health education in the entire district (ibid., p.11).

Around 1916, Hoffmann accidentally developed a groundbreaking knowledge that, according to preserved records, saved hundreds of lives. It was common practice in the treatment of fever conditions at that time to inject intravenous glucose solution. Glucose was expensive at the time and had to be ordered in large quantities from Budapest at once in order to save costs. Hoffmann prepared the injections himself. It is not known what led him to change standard procedures and to apply glucose to the subcutaneous tissue. The fact, however, remains that he noticed that glucose ampoules have different effects. "With newly opened, the effect of glucose in some bacterial diseases did not appear. The opposite occurred when he gave a subcutaneous injection of glucose solution from ampoules, which he had open 10 or more days ago" (ibid., p.12). After their use, there was an unexpected reversal of the disease. The fever subsided and the patients recovered from a condition that was normally hopeless. When examining the vials, Hoffmann noticed that open vials exposed to air for several days contained less recognizable fibers in the naked eye, which multiplied over time and identified as molds. He wrote the result of the observation in his notes: "Fungi, which multiply in dilute glucose solution, excrete into their environment a substance that is able to kill various bacteria both in test tubes and in the living body ..." (Medved', 1996, p.3).

Margita Hoffmann, Armin's wife, dies in 1917. It was not saved by glucose injection either. She is buried in a separate grave in the local Jewish cemetery. The space reserved for her husband's grave remained empty forever. But then no one could have guessed at that time (Marcinekova, Stern, Šmigel', Novák, Levický, 2018, p.12).

Even personal tragedy did not deter Hoffmann from further efforts to investigate the causes of his injection. He was aware of the primitives of making "miracle injections," and that they were only a coincidence. He knew their effect was unstable. However, fungal cultures in ampoules have been instrumental in the secondary complications of influenza, including pneumonia, which usually results in death. This also led him to the fact that later in the years 1919 - 1920, in the period of the so-called Spanish flu, he used his injections en masse. From the records of the registry in the Snina district for the years 1918 - 1920, it is known that out of 256 deaths, the cause of death in only 13 cases is the mentioned Spanish influenza (Konček, 1985, p.3).

Hoffmann constantly sought to obtain an independent evaluation of the effect of his injection. Despite repeated urgencies, no answer. It was not until 1922 that he received a shocking statement from Prague: "... the fibers that form in the glucose solution are contaminants!" This statement did not deter Hoffmann, and he further investigated the "contaminants". He also tested the injections on himself and "said that after each such injection he felt healthier, fresher, stronger and younger" (Marcinekova, Stern, Šmigel', Novák, Levický, 2018, p.13).

After the establishment of the fascist Slovak state, there was no time or space for legalization of injection treatment. From January 1, 1940, the practice of Jewish doctors in the whole territory of Slovakia was banned. At that time, 66-year-old Hoffmann worked as a retired doctor in the village of Stakčín. On March 31, 1941, an ordinance was issued for all Jews to wear a yellow ribbon on their sleeves. In this context, a decree was issued on the designation of the practice of Jewish doctors. According to it, all Jewish doctors with retained practice had to mark their medical practice exclusively with a wooden board measuring 20x30 cm yellow with black letters. "On the table, the word 'JEW' had to be in the header between two six-pointed

stars and only then could the name, type of practice, place and office hours be given" (ibid., p. 13).

In September 1941, Regulation no. 198, also known as the Jewish Codex, which deprived Jews of their civil rights, entered into validity. In 1942, Hoffmann also had to resign from his post in Stakčín. On March 25, 1942, the first deportation train of Slovak Jews to extermination camps was sent in Poprad. At that time, more than 85% of the Jewish population was deported from Snina. Baptism appeared to be the only salvation from the persecution and deportation for Hoffmann, but he did not know that in the first wave of deportations, full conversions were not taken into account. Among those deported in 1942 there were many freshly converted Jewish doctors. Hoffmann left the Israeli Church on February 25, 1942 and joined the Roman Catholic Church. Armin Hoffmann became Hermann Jozef Hoffmann (ibid., p. 17).

A partly symbolic and sad parallel is that in the same year that Hoffmann found himself on the fringes of society, in England Fleming began with the first applications of penicillin on members of the American and English armies (ibid., p. 17).

Later in September 1944, Armin Hoffmann died. He did not live to be recognized for his accidental discovery. His wooden coffin was marked with a simple Christian cross and was transported to the local Catholic cemetery. The sons of Armin, who managed to survive the hardships of war, sought to complete their father's discovery. The breakthrough did not occur until 1964, when the Research Institute of Antibiotics in Roztoky near Prague received the result of the analysis of an injection sample with the words: "...Contamination was found in all 25 vials ... close to *Penicillium frequentans*, *Penicillium implicatum*, etc." (ibid., p.17).

4.2 Arnošt Rosin – Escape from Hell

Arnošt was born on March 20, 1913 in the family of a Jewish merchant in Snina in eastern Slovakia. Arnošt Rosin - one of the million prisoners of the concentration camp and one of the few lucky ones who managed to escape from this cursed place (Šebo, 2017, p. 8).

He lived in Auschwitz for two years, dying in 2000 in Germany at an old age as a free man. Arnošt's parents Herman and Eva, born Weizen, had six children together. They lived in Snina on today's street of May 1 until the fatal year of 1942. The house in which the family once lived was demolished and today there are blocks of flats where several families live and no one has an idea that there used to live a family which fate was cruelly marked by Jewish origin (Marcinekova, Stern, Šmigel', Novák, Levický, 2018, p.27).

The youngest son, Arnošt, was taken to a concentration camp in Žilina on March 25, 1942, then deported to Auschwitz and the Brzezinka (Birkenau) concentration camp, from where he escaped on May 27, 1944 and became free (ibid., p.29).

When Arnošt came home to Snina to his parents for the Easter holidays in 1942, he would never think to himself that this visit would be fatal for him. His natives came to him in the uniforms of Hlinka's guard and licking boots, to whom he tried to explain that it must be a mistake and that he was only on a visit. It was not a mistake. His name appeared on the list of Jews located in the Slovak state. This list was created by the Ministry of the Interior on February 12, 1942, where employable Jews were specifically recorded. "Please, God, make it just a nightmare. Let me wake up." It was not a dream, he was taken along with twenty other Jewish men to Humenné, from there to a Jewish concentration camp in Žilina, and later to an extermination camp in Poland. Although he spent only fourteen days in the concentration camp in Žilina, he has already come into contact with humiliation and painful situations, as he himself says: "Guardsmen in black uniforms and high boots, they gave us the first concentration lesson. For no reason they cursed us, beat us,

kicked us and robbed us of personal property” (Šebo, 2017, p. 21).

From Žilina, transports went directly to Auschwitz. Arnošt also found himself in one of them. The transports usually consisted of twenty-five freight wagons used to transport cattle. It was written on the wall of the wagon that the space was for eight horses or forty-five soldiers. In fact, there were about a hundred of them there. They knew nothing about the destinations of the transports, no one knew where they were going and what awaited them. He described his departure to the deportation train as follows: “When they closed the sliding door, locked it with heavy padlocks, and put a strong guards on the train, we began to suspect that it was wrong. Two small windows in the wagon were barred with barbed wire that could not be removed with bare hands. Escape was impossible. They took us at night towards Čadca, the train stopped only in the morning at the Polish border station Zwardoň. At the command, we got out of the wagons, the guards recalculated us and handed us over to the German soldiers, who drove us back into the wagons and accompanied us on the next journey. On April 10, 1942, we arrived at the station marked Auschwitz. Soldiers were already waiting at the station in SS uniforms and took us to a concentration camp” (Šebo, 2017, p. 24).

In this moment, the SS men already divided the prisoners and showed who should go where. Arnošt survived the selection, he was sent to the right and became an Auschwitz prisoner. Those who went to the left were unlucky. Their path led directly to the gas. The others went through disinfection, cut them, gave them clothing and hard clogs on their feet. This was followed by a tattoo that took away people from the last pinch of human dignity. People became numbers (Šebo, 2017, p. 26).

Arnošt was in one block from which the infamous Sonderkommando was formed to bury the dead people. Later, at lunch, he found a gold chain in a loaf of bread that Arnošt had received from a friend from Sonderkommando (who had stolen it from the murdered Jews), which he had given to the block scribe. He helped him go to block 14 and get another job. The others were locked in one block and only went to work and back. After his departure from Sonderkommando, a certain Schmulleck tried to escape collectively, but it was discovered. And since no one wanted to divulge anything, they sent the whole commando into the gas. Even then, Rosin was very lucky and thanks to that he later became one of the crown witnesses of what he experienced here (Šebo, 2017, p. 32).

At the beginning of 1944, Arnošt moved to the so-called block Canada, where the confiscated property of prisoners and the slain was collected and sorted. Canada was a privileged place. Valuables for a more bearable life in the camp could be obtained here. However, the most important commodity was food (Šebo, 2017, p. 41).

On April 7, 1944, Alfred Wetzler and Rudolf Vrba managed to escape from the death camp. Everyone knew Wetzler was Rosin's friend. And so, he was questioned by two camp investigators on suspicion of aiding an escape. The two dreaded SS men, Perry Broad and Wilhelm Boger, interrogated him cruelly. There wasn't much missing and they would shoot him. But according to him, he was saved by saying: “If I had known about something, I would have run away with them, because I know that nothing but death awaits me here” (Marcineková, Stern, Šmigel', Novák, Levický, 2018, p.34). This cheeky response seems to have saved his life. As a punishment, he was transferred to forced labor on a gravel pit, where he met the Polish Jew Czeslaw Mordowicz - Rosin's partner on the run.

They planned the escape on Saturday, May 27, 1944. It was at that time that a large Hungarian transport arrived, which Arnošt used, and told blocker Gotze, who was on duty at the time, that his relatives from Hungary had come to the neighboring camp and would like to go see them for a while. Thanks to his exclusive position in the Auschwitz prison hierarchy – the blocker could move more freely and many SS men knew him

from sight. Gotze wrote the number 29858 on a piece of paper and promised to let him go later. When he later wanted to get to the gate, Danisch stopped him and put him back. On another attempt, he was stopped by the camp commander Schwarzhuber and had to return. “I told myself that it was an unlucky day, but Mordowicz and I had already agreed, so I went to try my luck until the third” (Šebo, 2017, p. 52). Gotze was still sitting at the gate, and when he noticed Arnošt, he reminded him to return as soon as possible.

Two people helped them escape, supervisor Adam from the block from Mordowicz and one Polish professor. They had a bunker dug in the gravel pit where they had previously worked. This place was to serve as their starting point. They knew that every time they ran, the guards would sound the alarm. Auschwitz had two guard circuits. One was still active and the other was several kilometers away. It wasn't activated until it was discovered that someone had disappeared from the camp. They activated this system for three days. The only way to escape was to hide outside the camp behind the first guard circuit and wait three days for a suitable opportunity until the second circuit is switched off (Šebo, 2017, p. 53).

Their hiding place was a pit 1.2 m wide and 1 m high. A wooden stick was placed in the middle of the pit to hold the board to cover the entire hole. First one went in, then the other. Around the bunker, it was necessary to pour strongly aromatic Russian tobacco, soaked in gasoline, so that the dogs would not sniff them out. They had the necessary supplies with them - water, salami, a flashlight, two cans, a lighter, bread and some money (Marcineková, Stern, Šmigel', Novák, Levický, 2018, p.35).

After an hour of hiding, sirens began to sound, and in the evening, when a mass census of prisoners took place, they found that two were missing. More than three hundred men with dogs searched the entire camp and the surrounding area. Rosin and Mordowicz, meanwhile, had a hard time in the bunker. Mordowicz recalled: “Suddenly we heard the scratching of dog paws, it felt as if someone was scratching your head. Fortunately, the combination of tobacco with gasoline worked. However, another problem arose. We began to feel a lack of air. The bunker was small, there was little air in it, the air supply apparently didn't work. We started choking. We felt that we would be buried alive here and the bunker would be our grave” (Šebo, 2017, p. 56).

The onslaught gradually subsided. They knew there had to be three days to hide, but it was hard to endure. Another problem was that later they could not get out of hiding. Their bodies were exhausted and weakened by a long stay still in the same position and motionless. Until their third attempt on Monday night, they managed to lift the board. They crawled between the two watchtowers, slid over the outer less guarded part of the camp, and defeated the uncharged barbed wire. After a kilometer, they noticed the river and the bridge they wanted to cross first, but they changed their minds. They finally crossed the river. During the wading, Mordowicz lost his shoes and began to shout that he could not go on like this. He wanted to return for the shoes, which would be extremely dangerous, so Arnošt gave him his. Thirty years later, when he reminded him of this incident, Mordowicz stated - you were always a cavalier. Well, thank you very much for such a gallantness, when he had to go for two days without shoes (Marcineková, Stern, Šmigel', Novák, Levický, 2018, p.36).

They successfully completed the first stage of the escape. When they were about 60 kilometers from Zakopane, they got on the train and just before Zakopane they got out and continued walking. They only moved at night and tried to avoid busy places and therefore wandered through the woods. They had to be wary of the Gestapo, the criminal police, the border guard and other elements of the Nazi power apparatus. Finally, on June 6, 1944, they managed to cross the Polish border and reach Slovakia (Šebo, 2017, p. 62).

Refugees from Auschwitz Vrba and Wetzler provided Rosin and Mordowicz with fake papers and ID cards. Rosin's name was Štefan Roháč and Mordowicz was Peter Matúš. With a false identity, they left for Bratislava to live two streets apart. Rosin thus lived until the liberation of Bratislava, i.e., April 4, 1945. Fate was merciless for Mordowicz. The guards caught him sitting in a restaurant with Wetzler's sister-in-law. He was suspicious because he was sitting with a Jew. And so he fell victim to the second wave of deportations, which were resumed in September 1944. He was taken to a concentration camp in Sered and back to Auschwitz. Along the way, he bit his wrist so that the Nazis would not see his number, because they would know immediately that he was a refugee. He decided that when he was on the ramp in Auschwitz during the selection, he would throw himself at the first SS man, who would pull out his pistol and shoot himself with it. Fortunately, this did not happen. He was recognized by a Polish prisoner on the ramp, who helped him hide. And he found himself among sixty Jews from Slovakia who were transported to a labor camp in Silesia, where he was liberated in 1945 (Šebo, 2017, p.76).

Czeslaw Mordowicz married and settled in Slovakia, later emigrating to Israel, from where he moved to Canada in 1993, where he died in 2001 in Toronto. Arnošt Rosin and his wife wanted to emigrate to America, but eventually settled in Germany, where they worked in a Jewish religious community. Arnošt Rosin died as a single man in old age in 2000 in Germany. Just before his death, he testified for the Holocaust Memorial Museum in the United States on things he had not been able to talk about for decades. (Marcinekóvá, Stern, Šmigel', Novák, Levický, 2018, p.40).

Although Czeslaw and Arnošt were different not only in nationality, character, but also in temperament. Czeslaw was six years younger, but all the more prudent. Sometimes the silent and exact opposite of Arnošt. However, their different natures did not affect mutual friendship. On the contrary, during the escape, when it went to hard, they complemented each other and helped each other. Unlike Vrba and Wetzler, whose relations were not harmonious in the post-war period, Rosin and Mordowicz continued to maintain good relations. This is evidenced by their joint trip in the early 50's, which they named *On Motorcycles in the Footsteps of Their Escape* (Šebo, 2017, p. 50).

4.3 Gizela Lipovská – the statement of the last Jew from Uličská valley

About 30 Jews returned to Snina and the surrounding villages shortly after the war, including Gizela Lipovská. There were only 5 Jewish inhabitants in Snina in 1948, and the only returning Jew lived in Uličský Kriv. In 2013, there was only one Jewish inhabitant in the entire Snina district. In 2015, at the age of 92, this last living Jew in the district - Gizela Lipovská - also died (Marcinekóvá, 2013, p. 13).

In 1941, when Slovakia entered the war with the Soviet Union, Gizela Lipovská's brother, Herman fled to Russia. The whole family was dragged to Ternopil as punishment. *"We were there for three days, investigating my father and beating him hard. They beat him because my brother joined the Bolsheviks in Russia"* (ibid., p. 19). Today, Ternopil lies in western Ukraine. In the past, a high percentage of the Jewish population lived in the city. From the inhabitants who lived there in 1939 50% were Poles, 40% Jews and 10% Ukrainians. In 1941, the city was occupied by the Germans and the extermination of the population gained momentum. They set up a camp there, which included not only Jews but also Christians, Hungarians, Poles and many people. *"The Germans beat them, shot them and threw them into the pit"* (Marcinekóvá, 2013, p. 19). Of the people who were shot by Germans and Poles most of them were Jews. *"It was said that locals borrowed German army weapons at the Ternopil cemetery and killed up to 500 of us"* (ibid., p. 19).

When the transports were resumed in 1944, it meant the final end for the family. They headed to Poland. They were forcibly

dragged out of the house for the third time. Well, now they weren't as lucky as they used to be. *"Now it was no longer because of my brother, but because we were Jews"* (ibid., p. 23).

Gizela Lipovská survived the horror of the concentration camp and returned home in 1946. Another unpleasant surprise awaited her here, completely strangers living in her hometown. *"There were two families, a grandfather with a grandmother and a man with a wife and two children. I lived with them for two years. Their house burned down during the war and so they let them live in ours"* (ibid., p. 41). When they moved out, she was left alone, and then her brother Leopold came. She got to know from him that the stepmother, along with her youngest sister and other half-sisters, had been assigned to those who were to be gassed in Auschwitz. My father worked in the camp for another month and eventually died there due to hard work (ibid., p. 41).

However, the joy of returning home was replaced by fear and anxiety about the Banderas, who, a year after Gizela's return, threatened mainly the Jews who returned. *"The Banderas were organized groups that formed members of the Ukrainian Insurgent Army, led by Stepan Bandera. They sought to rebuild an independent Ukraine and were an armed component of the Organization of Ukrainian Nationalists. First they fought against Germany and then joined them against the advancing Soviet army"* (Marcinekóvá, 2013, p. 44). After the defeat of the Ukrainian Insurgent Army, as well as the Germans, many groups of Banderas moved to the forests on the Polish-Ukrainian border. They also began to enter the territory of eastern Slovakia, where they worked until 1947. Their main concern was to survive and obtain clothing, food, alcohol and medicines from the local population. Jews and communists became their main targets (Marcinekóvá, 2013, p. 44).

Gizela Lipovská from Uličský Krivý experienced atrocities in her own skin in the *"death factory"* in Auschwitz. She lost her parents and six siblings there. The two brothers survived, but later died as a result of torture. The medical experiments of the infamous doctor Mengele also left consequences for her health. Due to these attempts, which were committed on her by the *"angel of death"*, she lost the most valuable thing and could never have children as a result (Marcinekóvá, Stern, Šmigel', Novák, Levický, 2018, p. 58).

Memories haunted her all her life. Until recently, she was the only living Jew in Uličská dolina. She survived the horrors of World War II, returned and lived here. She could not leave this place permanently. She often thought about the horror, though she didn't like to talk about it. *"But I still know that God is good, only we are evil"* (Marcinekóvá, 2013, p. 65).

4.4 A Jewess by Audrey Coddington

Writer and journalist Andrea Coddington was born on July 20, 1975 in Radošín. She studied journalism in Bratislava. She worked as a journalist in several Slovak media. After the fall of the New York twins, her professional life changed radically. At that time, she worked at Radio Okey, formerly Radio Koliba, and went to cosmopolitan New York as a foreign policy editor. And it was this author's professional career that was overseas when she created several of her books. One of them is the novel *The Jewess*, which was published by Ikar in 2010 and became a bestseller. For this work, the author earned the Platinum Book Award. At present, there is also a Hungarian translation of the book *The Jewess* on the market, by PaedDr. Magdaléna Hrbáček, PhD. – *A zsidő nő*, employee of the Institute of Central European Languages and Cultures FCES CPU in Nitra. The book was published in 2017 by Art Danubius. Since 2018, the book has been published worldwide and in English with the changed title *Dirty Jewess*. The title of the book was preceded by a long process: *"The term Jew sounds in English as such a prima donna, princess. In Slovakia, the word Jew was an insult. It took many years, a few changes, but it is so common in life that you*

have exactly the people you need then. And so the name Dirty Jew was born."¹¹

The plot of the novel takes place in the east of Slovakia in the small village of Porubka near Sobrance. The main character is Sofia, the daughter of a Jew named Simona, who survived the horrors of Nazi rampage firsthand. In the family where Sofia grew up, great emphasis was placed on adhering to Jewish customs and traditions. Several of them are described in the work, so the reader gets acquainted with the issues of Jewish culture. Among the individual holidays, the most important ones were missing, such as Shabbat - Saturday. "*Not the Jews kept the Shabbat, but the Shabbat kept the Jews*" (Coddington, 2010, p. 8). "*During Shabbat, we free our minds from everyday worries, jobs, creditors, debts, problems, and just as they freed our ancestors from slavery in ancient Egypt. We are free. We are Jews*" (ibid., p. 12).

Another important Jewish holiday mentioned in the book is r Passover, ie Jewish Easter. The main character of the novel recalls how her father Jakov brought dishes, cutlery and a plate set used only for Passover. Even how her mother made delicacies from typical mace flour. The day before, one crumb of bread – so called chumec was burned in their family, as well as in several Jewish families. The dining was exceptional, the dishes were special for meat and dairy dishes, kosher and all nicely set on the table. The basis of the seder is for the children to learn about the importance and liberation of the Jewish nation from slavery. At the Seder dinner, it is also customary for everyone at the table to drink four glasses of wine. The tradition is linked to four statements from the story of Exodus about the liberation of the Jews:

"I'll take you out."

"I'll set you free."

"I'll save you."

"I will receive you as my nation" (ibid., p. 121).

Among the traditions and important Jewish events, there was also the Bar Mitzvah festival, which plays a big role in the lives of Jewish boys. In this ceremony, a Jewish boy becomes a religious adult man (ibid., p. 197).

Jews preserve specific customs and traditions even at weddings. The week before the wedding, the couple must not be seen. "*He just walked and pushed tickets under my door and whispered in a keyhole*" (ibid., p. 144).

Just as the Jewish calendar has its cycle, so the story told in the book did not escape the life cycle. As is the case in the natural life cycle, which is part of every single one of us, whether a Jew, a Christian, a Muslim or an atheist. Even the character of the novel on the way to the search for happiness was met by the hardships of the life cycle. Death. The death of her closest beloved person - her husband. And on this occasion, she described one of the important habits associated with this event. "*My days were filled with emptiness, which gripped my soul, took root in my heart and completely controlled my actions, being, life ... But without it, it did not make sense to me. I sat behind him shiva for a week*" (Coddington, 2010, p. 202). According to the Torah, Shiva is the closest relative of the deceased. Mirrors are covered in the houses, the family does not take a shower, does not bathe, does not cook, does not go to work. Jews are not in the habit of carrying flowers to the graves of the dead, but place stones or papers with them as they do at the Wailing Wall (ibid., p. 219).

The book brilliantly describes the story of a Jewish girl from eastern Slovakia who wanted to conquer the world, which she eventually succeeded in, but also draws the reader into the realities and essence of Judaism. It describes the difference between the individual Jewish branches and approaches Judaism from several point of views. "*He is not a Jew like a Jew... There*

are many branches in our religion. We are ultra-pious, liberal, orthodox, conservative, and so on" (ibid., p. 123). The protagonist described the culture shock she experienced after moving to New York. In the district in which she lived, she first met the Satmar Hasids, who are recognizable by their clothing and lifestyle. Black suits and long sideburns are typical for men. Women, on the other hand, in long skirts and the whole shrouded even in the greatest heat. Married women are characterized by a shaved head, which is covered with wigs. In Europe, the main character never encountered them, because they come from the areas most affected by the Nazi murder. "*The life philosophy of the Satmars was something I had never encountered in my life*" (ibid., p. 123).

The book is also a good guide not only to customs and traditions, but also to a varied example of Jewish culture, of which Jewish cuisine is an integral part. And it was the kitchen and the food that connected Sofia's life with her husband Harry. She met him in America at a pizzeria he and his brother Teddy owned. Broadway's Jerusalem 2 - the largest kosher fast food with unique success of its kind in the United States. "*Teddy and Harry expanded their menu with pasta salads, puff pastry dresses - borekas, typical Jewish pastries - bagels, hummus, tahini and other Middle Eastern specialties*" (ibid., p. 148).

Candles are an integral part of Jewish culture. Candles are a symbol and characteristic of the holidays. And just for one holiday - Hanukkah, candles are the most typical. "*Let's light the first candle on the menorah. The one on the far right as it should be*" (ibid., p. 229). From the middle candle called shames the first real candle on the nine-armed candlestick is lit. One discount is added to this first lit candle every night. "*It was a long time ago when a miracle happened and a candle that was supposed to burn for one day burned for eight days ... We will celebrate a miracle for eight days and eight nights*" (Coddington, 2010, p. 229). When Sofia's sons were young, they received various gifts for the holiday. When the sons grew up the gifts turned into money called Hanukkah gelt.

Jewish holidays and traditions are unique and specific, although at first glance it may seem that their only principle is eating. "*They wanted to destroy us, to starve us. They failed. Let's eat*" (ibid., p. 222). This is also one of the Jewish jokes. The origin can be traced to the fact that food is an integral part of Jewish culture.

The book is not limited to Jewish culture, but also serves as a geographical example of the traces of Judaism. Sofia leads us through communist Czechoslovakia, as well as Hungary, Bulgaria, Italy, Israel and finally the United States.

Jerusalem was, is and will be the center of Judaism. The city was twice destroyed, besieged 23 times, conquered 44 times and attacked 52 times. The Wailing Wall is considered to be the holiest site of Judaism. People from all over the world put papers with wishes in the gaps between the stones, regardless of their religion. And it was Harry, Sophie's husband, who took her to his homeland for the first time - Israel. "*Harry grew up in the ancient city of Jaffa, which is considered one of the oldest ports in the world. Everything there breathed history, it is easy to believe that the city is named after Jafet, one of Noah's three sons, who allegedly built the city forty years after the biblical flood*" (ibid., p. 165). Another center that Sofia's story showed readers was Tel Aviv. "*Tel Aviv is a modern, hot Eilat in the Gulf of Aqaba is ancient. Eilat was one of the stops of the Israelites on the run from Egyptian captivity and was conquered by King David. Thanks to Herry and my father's talking at Shabbat evenings, history became a reality, tangible. We promised our children's bar mitzvah would be in Israel. In Jerusalem*" (ibid., p. 166).

The Jewess is a book full of emotions and tension. This true story brings the culture of an ethnic group professing the Jewish faith. It also maps the absurdity of the time in which Sofia was born. It asks a lot of questions, but also answers. "*After all, the Torah says that the essence of our religion is questions and*

¹¹ <https://www.kosiceonline.sk/spinava-zidovka-silvie-fishbaum-mieri-na-americky-trh>

answers" (ibid., p. 220). The book is symbolically divided into thirteen chapters. The number thirteen represents a lucky number for Jews and also a number symbolizing the bar mitzvah (ibid., p. 232). "Same, and yet different" (ibid., p. 23). In this way, too, the essence of the book *The Jewess* could be summarized in one sentence.

5 Conclusion

An important and still current is the analysis of works, documentation of Jewish destinies and Jewish issues. Even today, various memoirs, publications, brochures and articles on the subject are published in the area of eastern Slovakia. We see that the topic of the Holocaust is still relevant today. In some ways more and others less explored, but never unnoticed and forgotten. Knowing history is important, but knowing the fates of individual Jewish heroes is important in order to understand the unwavering will to survive under certain circumstances. East Slovakia offers many stories of personalities of Jewish origin. They breathe the past and a piece of history that should never be forgotten. "Anyone who saves one life will save the whole world" (Talmud).

Literature:

Literary Sources

1. Coddington, Andrea: *Židovka*. 1. vyd. IKAR, Bratislava, 2010. 239 p. ISBN 978-80-551-2349-3.
2. Marcineková, Jaroslava: *Posledná Židovka z Uličskej doliny*. Elinor Snina. 2013. 89 p. ISBN 978-80-970408-3-3.
3. Marcineková, Jaroslava – Stern Tomáš – Šmigel Michal, Novák Jozef, Levický Juraj: *Fragmenty židovstva* (Snina a okolie). ELINOR Snina, 2018. 111 p. ISBN 978-80-970408-8-8.
4. Šebo, Ján: *Útek z pekla. Príbeh Arnošta Rosina, väzňa, ktorému sa podarilo ujsť z Osvienčimu*. Marenčín PT, spol. s r. o., Bratislava, 2017. 183 p. ISBN 978-80-569-0116-8.

Scientific literature

1. Adamická, Monika: *Slovenské židovstvo v tvorbe Antona Baláža*. Nitra: Univerzita Konštantína Filozofa, 2019, 116 p. ISBN 978-80-558-1427-8.
2. Buraľová, Iveta: *Národný park Poloniny. Súčasť Medzinárodnej biosférickej rezervácie Východné Karpaty a svetového prírodného dedičstva Karpatské bukové pralesy*. Štátna ochrana prírody SR, Banská Bystrica, 2015, 19 p. ISBN 978-80-89802-94-4.
3. Gallik, Ján: Formovanie stereotypného pohľadu na Židov v slovenskej tlači. In *Imagológia ako výskum obrazov kultúry (K reflexii etnických stereotypov krajín V4)*. Nitra: Univerzita Konštantína Filozofa v Nitre, Fakulta stredo európskych štúdií, 2018, pp. 73 – 86. ISBN 978-80-558-1294-6.
4. Ivaničková, Alžbeta: *Regionalizácia a priestorová organizácia regionálneho rozvoja*. Bratislava: Ekonóm, 1998. 175 p. ISBN 80-225-0937-X.
5. Konček, Dávid: „Cukrová“ injekcia doktora Hoffmanna. In. *Roľnícke noviny*, 16.8.1985.
6. Medveď, Ján: *Zázraky sa nedejú*. In: *Východoslovenské noviny*, 12.2.1966, roč. XV, č. 38.
7. Podolák, Ján: 1985. Horná Cirocha. *Východoslovenské múzeum v Košiciach*, 1985. 624 s.
8. Vargová, Zuzana: *Židovský fenomén v stredo európskych súvislostiach*. Nitra: UKF, 2011, 108 p. ISBN 978-80-8094-964-9.
9. Uličný, Ferdinand: *Dejiny osídlenia Zemplínskej župy*. Michalovce, 2000. p. 707. ISBN 80-968579-1-6.

Internet

1. Bycko, M: *Rodokmeň Andyho Warhola*. Online: <https://www.muzeumaw.sk/clanok/rodokmen-andyho-warhola>
2. *O Zemplíne*. Online: <http://www.regionzemplin.sk/o-regione-zemplin/>.
3. „Špinavá Židovka“ *Sylvie Fishbaum mieri na americký trh*. Online: <https://www.kosiceonline.sk/spinava-zidovka-sylvie-fishbaum-mieri-na-americky-trh>.

Primary Paper Section: A

Secondary Paper Section: AA, AB, AJ

EARLY INTERVENTION AS A FUNDAMENTAL ASPECT FOR THE PREPAREDNESS OF CHILDREN WITH SPECIAL LEARNING NEEDS INTO THE EDUCATION ENVIRONMENT

^aANNA HUDECOVÁ, ^bSTANISLAV BENČIČ, ^cJANA HRČOVÁ, ^dMARTINA MAGOVÁ

^{a, c, d} Department of Pedagogy and Special Education, Catholic University, Hrabovská cesta 1A, 034 01 Ružomberok, Slovakia
email: ^aanna.hudecova@ku.sk, ^cjana.hrcova@ku.sk, ^dmartina.pudisova@ku.sk

The paper is a partial output from the project KEGA 013KU-4/2019 E-learning educational modules on the issue of early care for families with children at risky development

Abstract: The paper describes the content and subsequent evaluation of the project with the intention of early intervention. The project of interest concerns the issue of early intervention, which is focused on the family with a child with a risky development. The project in question was evaluated very positively by experts and parents. The results of partial outputs (in the form of documents and supporting materials) in the evaluation process pointed out the importance of early intervention, which forms the basis of the readiness of a child with special educational needs for the educational process.

Keywords: evaluation, project, early intervention, special educational.

1 Ingression to Early Intervention

Early intervention is care, help and support for children with developmental disorders (with potential developmental problems) from birth. This period of development applies to the child from birth to six years of age, including the family as a system (Guralnick, 2001; Soriano, 2005; Thurmar et al, 2010; Bernasconi, Boing, 2015). According to Frohlich et al. (2005) and by Czeizelová (2009) such a form of help and support is needed for families who have a child with a disability. It is also suitable for families where a child with a risky development is being raised.

Children at risk of development in this sense are perceived as children in whom a developmental delay has been diagnosed or is expected to be endangered under the influence of negative exogenous or endogenous factors (Tichá 2014). Neurobiological and other human scientific disciplines have shown in recent decades that the early period of human development is crucial for its further development. In this early period, the child develops the fastest from a biological, psychological, social and emotional point of view. According to Soriano (2005), relationships and interactions between the parent and the child are formed during this period, which is an essential factor in the development of not only mental but also physiological functions. The parents' role is important within early support in the healthy child's development; special approaches are needed for the children with disabilities. Considering those facts, there was created a practical concept of helping children with developmental disorders and their families, the concept called for early intervention. It is based on the assumption that the development of an early child is largely influenced by mutual interactions with parents and the family atmosphere because the parents play an important role in the early development and growth of a child. Early intervention is focused not only on stimulating the child's development but also on supporting and assisting the family system during a crisis life situation (cf. Blasco 2001; Oberklaid, 2010; Tichá, 2014; Kováčová, 2016).

The family plays an important role in human development, from birth to old age. Matoušek, Pazlarová (2010) states *"the family is the first and binding model of society that the child encounters in its development. At the same time, the family presents certain values to the child, exposes him or her to certain conflicts and provides to the child a certain type of support"* (Matoušek, Pazlarová, 2010, p. 8). A family is a dynamic unit in which constant changes take place during its existence. Some changes in the family are expected, for which the family is theoretically prepared. These include the birth of a child, the entry of the child/children into school, leaving of adult children off the family, etc. At the same time, changes can be unexpected. These

include the birth of a child with a disability, divorce of parents, unexpected death of one of the family members, dependence of one of the family members, or mental illness, etc. Every illness, disability that appeared and became part of the family can be understood as a crisis of the whole family if we admit that most people with disabilities exist in relatively normal social relationships (Mydlíková, 2013). Even though the birth of a child with a disability is a serious trauma for the family, it is not an insurmountable situation. In many cases, it depends on whether the family can face the situation. It is evident that a child with a disability largely determines the lifestyle of the primary family, but an important role, in this case, is played by a support network on which the family can rely (Kováčová, 2019; Kováčová, Lištiaková, 2017). The opinion that crises are positive is gaining ground today. Their output should be the adoption of new, more effective strategies for overcoming life obstacles (Špatenková, 2009.) The birth of a child with a disability can be such a burden. For these reasons, the issue of early intervention makes sense. And it is this normality of the social relations of the family that is one of the hopes for a positive development of a person with a disability.

Early intervention has undergone various changes in recent years. It depended in many respects on political factors, on institutional systems, on undergraduate and postgraduate training, and also on the competence of the experts themselves, by whom it was provided in practice.

1.1 Early Intervention in Slovak conditions

At present, early care in Slovakia is vested in Act no. 448/2008 Coll. about Social Services to support families with children and further is in the Concept of Special Education Counselling. Those documents include duties for early care such as diagnosis, intervention, and counselling.

Intervention for families is provided to children up to the age of seven if their developments are endangered due to disabilities. Some facilities offer early intervention include high-risk neonatal wards, early childhood diagnosis and therapy departments, private clinics, special needs education counselling centres, social service homes, children's homes, as well as various non-profit organizations and civic associations (Tichá, 2014). Even though each of the mentioned facilities provides aid for child development. In 2014 the early intervention network has been established as a non-profit organization that seeks to provide comprehensive support to the families through a transdisciplinary expert team (psychologist, social worker, special pedagogue, physiotherapist, speech therapist, therapeutic educator).

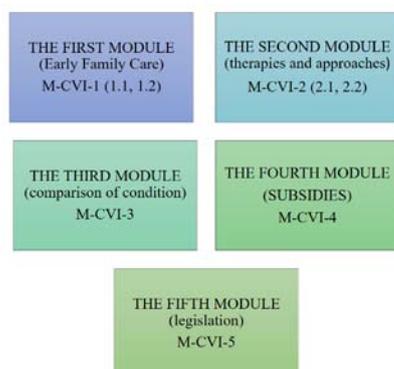
Since the beginning of 2015, Early Intervention Centers have been established in the Slovak Republic, namely, in Bratislava, Žilina, Banská Bystrica, Prešov, Košice, Trenčín, and they have also been invited to participate in this project. The mentioned centres work based on the early care pedagogical model that is oriented to children with risky development, disability or disease (Kováčová, 2019). The main purpose is to form an effort for intensifying developmental stimulation, compensation, reeducation or correction of child limits.

2 Comprehensive Evaluation of the Early Intervention pedagogical model

The pedagogical model is usually represented by workers from the field of assisting professions, for example, teachers, special and therapeutic pedagogues, psychologists within counselling facilities or kindergartens (Kováčová, 2019). Currently, in the context of early care and supportive therapeutic strategies, there is no information materials (considering conditions of our country), which would provide insight into the mentioned issue in terms of theory, application, research, and praxeology. It is the

content line of the project that has the ambition to be helpful and at the same time could be a benefit for the gradual development of early care (counselling, diagnostics, intervention) in our conditions.

Figure 1: Project structure based on modules



3 Project Evaluation

The conceived project intended to create a unique e-material that is currently absent in our conditions, which primarily meets the needs of practice in the field of therapeutic concepts to help in early assistance to families with children with risky or potentially risky development.

From a transdisciplinary and interdisciplinary point of view, the approach develops the issue of early care with the use of therapeutic concepts of assistance in the process of counselling, diagnosis and intervention.

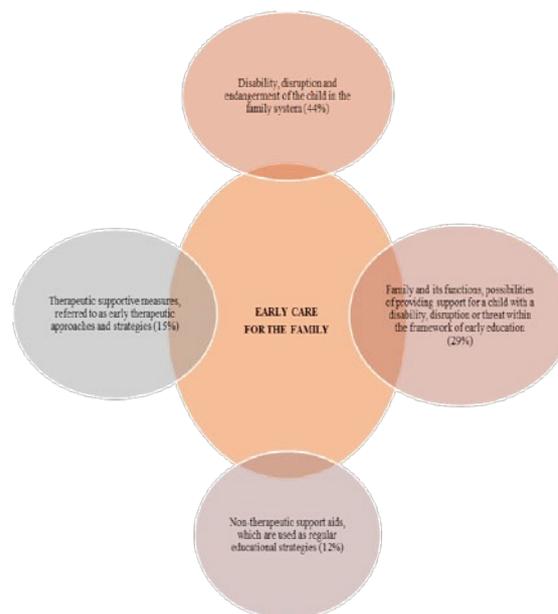
3.1 THE FIRST MODULE - characteristics and evaluation

Theoretical module (M-CVI-1), which is divided into two relatively large units. The first unit is a module called Early Family Care. The mentioned module will contain a comprehensive overview of basic professional and scientific knowledge in the field of therapeutic concepts to help in early family care. This module enables pedagogical staff and students to understand the psychological, psychotherapeutic, medical, special pedagogical and educational aspects of therapeutic concepts to help in the early care of a family with a child with risky or potential risky development.

It provides information on the possibilities of diagnostics, counselling and intervention in solving family problems. It is about developing topics such as:

- the birth of a child with a risky or potentially risky development
- support for the family as a system,
- support for siblings,
- support of the child from the interdisciplinary point of view of helping professions,
- support for volunteers.

Figure 2: Share of individual topics in the FIRST MODULE



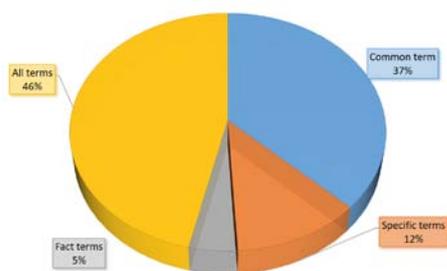
When evaluating the topics in the FIRST MODULE, we chose 4 topics (Table 1).

Table 1: The topic (FIRST MODULE)

The first topic	<ul style="list-style-type: none"> Focuses on the definition of basic terminology focused on the disability, disruption and threat of the child in the family system. Compared to other topics this one is dominant. At the same time, we consider it to be important since the parents after a child's birth need to search for information and a prognosis of disability. It has a 44% share of the total module content. Individual findings are documented in the following tables.
The second topic	<ul style="list-style-type: none"> The content of the second topic focuses on the family and its functions, on the possibilities of providing support for a child with a disability, disruption or threat in early education. The topic was evaluated as important for obtaining information from parents who found themselves in a difficult life situation. It has a 29% share of the total module content. Individual findings are documented in the following tables.
The third topic	<ul style="list-style-type: none"> Focuses on the supportive means of non-therapeutic nature, which are used as common educational strategies. The total proportion of the content filling module has a 12% share. Individual findings are documented in the following tables.
The fourth topic	<ul style="list-style-type: none"> Focuses on the supportive means of a therapeutic nature, called early therapeutic approaches and strategies. The total proportion of the content filling module has a 15% share. Individual findings are documented in the following tables.

Based on the analyses of generated documents (Figure 3, Table 1), the research team did the final analysis and subsequently assessed it.

Figure 3: Analysis of specific text (FIRST MODULE)



For each part of the FIRST MODULE, certain degrees of syntactic and semantic difficulties were selected.

Table 2

degrees of syntactic difficulties	15,912
degrees of semantic difficulties	27,3

Three other modules contain information that is based on documents that have been published outside the described project.

3.2 The SECOND MODULE – therapies and approaches

The praxeological module (M-CVI-2) was divided into two content-rich units. In terms of content, it provides practical possibilities as well as limits of help through expressive therapies and therapeutic approaches.

Two topics were generated into the module: Expressive therapies in early care, and Early care therapeutic approaches (Figure 4).

Figure 4: Share of individual topics in the SECOND MODULE

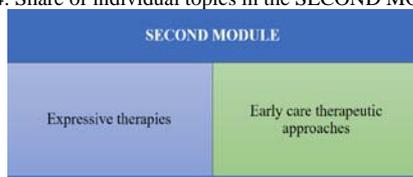
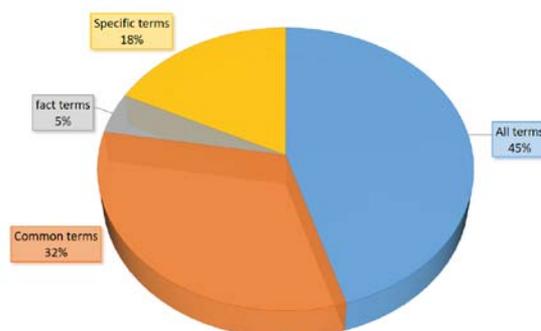


Table 3: The topic (SECOND MODULE)

The first topic	<ul style="list-style-type: none"> Expressive therapies (M-CVI-2.1) in early care contains information on specific possibilities of support, activities and games within various therapies. Specifically expressive therapies involving early art therapy (Valachová et al., 2019), early bibliotherapy (Kováčová, Lištiaková, 2017; Chanasová et al., 2020), early psychomotor therapy, early music therapy, early drama therapy, etc. The recommendations on a case-by-case basis take into account the peculiarities of specific disadvantages. It has a 65% share of the module total content. Individual findings are documented in the following tables.
The second topic	<ul style="list-style-type: none"> Early care therapeutic approaches (M-CVI-2.2), contains information about existing options of supports and games that are applicable therapeutic approaches. These include the use of the concept of basal stimulation, Snoezelen, Sensory Integration Therapy (Fábry Lucká, 2020), Early Occupational Therapy (Ergotherapy) and others (Kováčová, 2016; Kováčová, Lištiaková, 2017). It has a 35% share of the total content of the module. Individual findings are documented in the following tables.

Based on the analyses of generated documents (Figure 4, Table 4), the research team did the final analysis and subsequently assessed it.

Figure 4: Analysis of specific text (SECOND MODULE)



For each part of the SECOND MODULE, certain degrees of syntactic and semantic difficulties were selected.

Table 4

degrees of syntactic difficulties	11, 214
degrees of semantic difficulties	22,8

3.3 The THIRD MODULE – comparison of condition

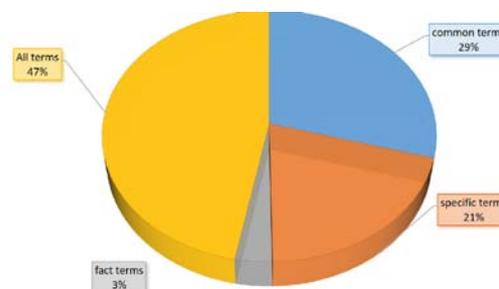
Due to the commercialization of educational services, there are rare comparisons of educative institutions for people with specific needs. The position of schools in comparison with the past is significantly changing considering the declining demographic curve and increasing competition in the market of education (Pitoňáková, 2016). Otherwise, ethical issues and social marginalisation are more and more topics of immediate interest, especially in mass media (Hajduk, 2020).

Table 5: Comparison of conditions with individual states (THIRD MODULE)

Comparison	%
Comparison of conditions at the national level	48
Comparison of conditions at European level	34
Comparison of conditions at the level of countries outside Europe	18

Comparative Module (M-CVI-3) provides a comparison of the conditions in Slovakia with the existing conditions in the neighbouring countries. The individual findings are documented in the following table (Figure 5, Table 6).

Figure 5: Analysis of specific text (THIRD MODULE)



For each part of the THIRD MODULE, certain degrees of syntactic and semantic difficulties were selected.

Table 6

degrees of syntactic difficulties	17,85
degrees of semantic difficulties	31,6

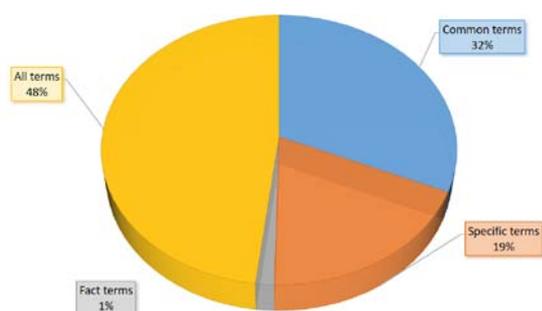
3.4 THE FOURTH MODULE – subsidies

The grant (subsidy) module (M-CVI-4) consists of support for teaching staff and students. It is a collection of professional, scientific and research papers and studies from the authors of the project in the field of pedagogy, psychology, medicine, nursing and psychotherapy.

The subsidy module will provide an overview of the latest scientific and research findings in the field of therapeutic concepts of assistance in the field of early care for families with children with risky or potentially risky developments.

The Slovakian experts have not yet been systematically trained for providing early intervention services, it is surprising that in the Slovak Republic no study program would anchor this fact and prepare experts for practice. In recent years, early intervention in academia has been provided as part of studies in helping professions such as a semester or two-semester theoretical preparation, which is rather informative.

Figure 6: Analysis of specific text (FOURTH MODULE)



For each part of the FOURTH MODULE, certain degrees of syntactic and semantic difficulties were selected.

Table 7

degrees of syntactic difficulties	15,4
degrees of semantic difficulties	25,9

3.5 The FIFTH MODULE – legislation

The legal-legislative module (M-CVI-5) expands the competencies of pedagogical staff and students in the field of early intervention in terms of legal-legislative awareness of family support as a system. This module was not subject to the evaluation, as legislative documents were not analyzed.

6 Conclusion

We consider improving awareness of early intervention to be an integral part of inclusive awareness and building an inclusive society. The project was conceived under the National Program for the Development of Living Conditions of Persons with Disabilities for the years 2014–2020 in the areas of raising awareness and respect for the family and home. Early care and information about it, not only among the scientific, professional and general public, can expand and support the quality of provision and effectiveness of use within the counselling individuals in their surroundings who require individual and specific care from birth and probably throughout life. By expanding this support service with enlightenment, the quality of life and survival of the child and the whole family as a system also increases.

Literature:

1. Bernasconi, T., Böing, U. *Pädagogik bei schwerer und mehrfacher Behinderung*. Stuttgart: Kohlhammer, 2015. 289 p. ISBN 978-3-17-023436-9.

- Blasco, P. *Early Intervention Services for Infants, Toddlers, and Their Families*. USA: Allyn and Bacon, 2001. 348 p. ISBN 0-205-19443-5.
- Czeizelová, B. A koragyermekkori intervenció múltja, jelene és remélt jövője. In: *Gyógypedagógiai Szemle*, Vol. 37, No. 2, 2009, p. 153-160.
- Fábry Lucká, Z. Nonverbal expression in multisensory approaches. *Expresivita vo výchove III*. Bratislava: Univerzita Komenského v Bratislave, 2020. p. 156-170. ISBN 978-80-223-4931-4.
- Fröhlich, A., Heinen, N., Lammers, W. (Hrsg.). *Frühförderung von Kindern mit schwerer Behinderung: Texte zur Körper-und ehrlfach behindertenpädagogik*. Düsseldorf: Verlag selbstbestimmtes Leben, 2007. ISBN 978-39100-956-9.
- Guralnick, M. A Developmental Systems' Model for Early Intervention. In: *Infant and Young Children*. Rockville: Aspen Publishers, 2001. ISSN 0896-3746.
- Hajduk, L. *Etická regulácia médií*. Bratislava: Paneurópska vysoká škola, 2020. ISBN 978-80-89453-71-9.
- Hudecová, A., Brozmanová Gregorová, A. et al. *Sociálna práca s rodinou*. Univerzita Mateja Bela v Banskej Bystrici: Pedagóg, 2009. 250 p. ISBN 978-80-8083-845-4.
- Chanasová, Z., Kováčová, B., Libertini, R. Early family education oriented at virtues with use of animal heroes. *QUAERE 2020*. Hradec Králové: Magnanimitas akademické sdružení, 2020. p. 717-726. ISBN 978-80-87952-32-0.
- Kováčová, B. E-learning training modules on the issue of early intervention in the family with a child with developmental risk. *Expresivita v (art)terapii II*. Ružomberok: Katolícka univerzita v Ružomberku. VERBUM - vydavateľstvo KU, 2019. p. 89-99. ISBN 978-80-561-0690-7 [CD-ROM].
- Kováčová, B. Terapeutické prístupy pri podpore rodiny so sťažnou životnou situáciou. Hašková, V., Buk-Cegielka, M. (Eds.). *Edukačné výzvy a úlohy vo svetle encykliky Laudato si' II*. Ružomberok: Verbum - vydavateľstvo Katolíckej univerzity v Ružomberku, 2016. p. 71-81. ISBN 978-80-561-0377-7.
- Kováčová, B., Lištiaková, I. Analysis of early childhood occupational therapy intervention in a group of clients with low graphomotor skills. *Journal of Exceptional People*. Vol. 1, No. 10, 2017, p. 93-106. ISSN 1805-4978.
- Matoušek, O., Pazlarová, H. *Hodnocení ohroženého dítěte a rodiny*. Praha: Portál, 2010, 184 p. ISBN 978-80-7367-739-8.
- Mydlíková, E. *Rodina a kognitívno-behaviorálny prístup*. Trnava: 2019. 127 p. ISBN 978-80-568-0374-5.
- Oberklaid, F. *Investing in the Early Years*. Challenges and Opportunities for Victoria, Presentation to FaCS. Melbourne: Centre for Community and Child Health, 2010. ISBN 878-1-500-53-8.
- Pitoňáková, S. Public relations as a part of the presentation for teachers. In: *Vysšeje humanitarne obrazovanije XXI veka: problemy i perspektivy : materialy odinadcatoj meždunarodnoj naučno-praktičeskoj konferencii: 28.9.2016 Samara*. Samara: PGSGU, 2016. p. 172-183. ISBN 978-5-8428-1068-0.
- Soriano, V. *Raná péče: analýza situace v Evropě: klíčové aspekty a doporučení: souhrnná zpráva*. Brusel: Evropská agentura pro rozvoj speciálního vzdělávání, 2005. 53 p. ISBN 8791500583.
- Špatenková, N. Krize. In: Baštecká, B. et al. *Psychologická encyklopedie: aplikovaná psychologie*. Praha: Portál, 2009. 520 p. ISBN 978-807367-470-0.
- Thurmair, M., Naggl, M. *Praxis der Frühförderung: Einführung in ein interdisziplinäres Arbeitsfeld*. München: Ernst Reinhardt Verlag, 2010. ISBN 978-349702-195-6.
- Tichá, E. Podpora rodiny v procese ranej starostlivosti. In: Kováčová, B. (Ed.). *Liečebná pedagogika I*. Bratislava: Univerzita Komenského v Bratislave, 2014. p. 46-58. ISBN 978-80-223-3736-6.
- Valachová, D., Lessner Lištiaková, I., Kováčová, B. Gallery as an explicit stimulation environment in the development of artistic talent. *Muzeológia a kultúrne dedičstvo*. Vol. 7, No. 2, 2019, p. 49-62. ISSN 1339-2204.
- Zákon č. 448/2008 Z.z. o sociálnych službách

Primary Paper Section: A

Secondary Paper Section: AM, AN

E-PANOPTICON OF FACE-TO-DISPLAY WORKERS: FROM THE OFFICE TO THE HOME

^aMICHAL BEŇO, ^bJOZEF HVORECKÝ, ^cJOZEF ŠIMÚTH

Institute of Technology and Business in České Budějovice, 370 01 České Budějovice, Czech Republic
Vysoká škola manažmentu, 851 04 Bratislava, Slovakia
 email: ^abeno@mail.vstecb.cz, ^bhvorecky@mail.vstecb.cz, ^cjsimuth@vsm.sk

Abstract: Electronic Monitoring (EM) is becoming prevalent, enabling varied and pervasive monitoring of workplaces. The research design was a set of e-mail surveys. Quantitative data were analyzed using cross-tabulation of data, descriptive and chi-square tests statistics. The study provides an overview of e-worker monitoring in five countries. Twenty percent of respondents believe that their organization uses employee monitoring software to track their activities. Almost half of the e-workers believe that their activities are not being tracked by software. Nearly 1/10 of the face-to-display workers surveyed would trust their employer more using EM. Four-fifths of e-workers state that EM affects their productivity. Presented data emphasizes that companies using face-to-display workers monitoring software can negatively affect morale and productivity instead of producing better work. Further, employees are often unfamiliar with whether or not there is monitoring software tracking their activities. The study recommends that organizations should inform its employees before implementation of EM system to facilitate their positive attitudes

Keywords: e-working, e-panopticon of face-to-display workers, software, productivity, V4 and Austria.

1 Introduction

With the current global Covid-19 pandemic, organizations (big, small, global or local) found themselves in the same work conditions. They have been forced into face-to-display work (e-working) situations. Eurofound (2020) indicated that up to 40% of working employees in the EU began to e-work full-time as a result of the pandemic. A simple definition of e-working is working at a distance; however, in fact, e-working is far more complex. It is called different names, including teleworking, telecommuting, mobile working, nomadic working and others. It refers to the replacement of telecommunications for any form of work-related travel, thereby removing distance limitations and problems associated with classical commuting. (Nilles, 1998; Hunton and Norman, 2010). Information and communication technologies (ICTs) have released workforces from the constraints of a fixed work place, enabling mundane tasks to be distributed across remote locations (Harrison et al., 2000). Societal changes (the constantly evolving demography, environmental issues and ICT) have an impact on the way we work, and when, how and where we work (Beno, 2019).

Knowledge is seen as central to the success of individuals and organizations and an asset that needs to be managed. The implementation of e-working arrangements during the pandemic has had an enormous impact on the whole organization and employees. This remote-work experiment is an alert to organizations being prepared in the future, when employees will expect to be fully supported in e-working environments as they are in the office. Our ability to cooperate in this type of work habitat makes knowledge management (KM) a necessity. The linkage to how KM powers e-working is visible: it enables findability, connectivity, collaboration and corporate culture. Generally, technology leaders are dependent on KM, but most organizations are behind where they need to be support remote work environments.

Employee monitoring is becoming more common in the workplace (Kirsten and Freeman, 2003; Pitesa, 2012; Kiziloglu, 2018). E-monitoring tools offer managers the ability to continuously evaluate and measure their employee's appraisal (Al-Rjoub et al. 2008). As (Moussa, 2015) underlines, there is no need to police a workforce because no one can work 8 hours without breaks, and a culture of disloyalty and distrust within the organization may emerge.

The growing demand for e-working, the widespread policy drivers and the increase of their usage during Covid-19 have emphasized the need for real-life evidence. Our research was

conducted by an online email survey. It addressed the following research questions:

RQ1: Is better to leave room to e-employees instead of spying them?

RQ2: Can e-employee monitoring software (EMS) affect productivity?

RQ3: Is e-employee monitoring software reliable?

The next section provides an account of the concept of e-working and e-monitoring in the workplace. The next part briefly outlines the methodology used in this research. Following paragraph gives an overview of our results. Then the sections presenting our discussion and research limitations follow. The last section comprises our conclusions.

2 Literature review

2.1 E-working

Telecommuting was first introduced by Jack M. Nilles in 1970s (Nilles et al. 1974). The early main driver was to let employees save costs of commuting to work (Nilles et al., 1974; Nilles, 1997), and later, working at home was linked with gasoline savings (Schiff, 1979).

There is still no uniform definition of teleworking/telecommuting but several definitions of this phenomenon (Beňo, 2021). The classic definition of teleworking is outdated (Beno, 2018). There are broader approaches to this kind of work (Allen et al. 2015; Nicklin et al. 2016). Some do not require certain regularity and location, while others are fairly traditional about them. The concept of ICT (information and communications technology) enabled work from afar i.e. telework, also known as remote work, virtual work or telecommuting (Gajendran and Harrison, 2007). "Since the idea of telecommuting has been around for decades now, it makes sense that new words and phrases would come to replace what is, in theory, a not-so-new workplace concept" (WorkFlexibility, 2018).

We define e-working as performing job-related work outside the office premises electronically and transferring data to the office/customers/partners or to other locations. Telework covers more than just working at home and communicating with the office via telecommunication tools (Nilles, 1994). In this sense, it includes home-based work, work centres, neighborhood or satellite offices (Nilles, 1994), mobile and virtual work. Kurland and Bailey (1999) defined these four different teleworking types as follows: (1) The Home Office, (2) The Satellite Office, (3) The Neighborhood Work Center and (4) Mobile Working. Thus, face-to-display work can be located at any distance from headquarters, a work center, on the way or in the virtual world. These factors (individual, job, organizational and family/home) impact telework (Baruch and Nicholson, 1997).

2.2 E-panopticon (e-monitoring) of Face-to-Display workers

Every manager is concerned about efficient and effective exploitation of working hours and their results. Tracking, control and surveillance of workers at the workplace is therefore not a new concept (Burawoy, 1982; Foucault, 1979). Ajunwa et al. (2017) highlight that there is a rich and varied history of bosses watching over and monitoring their workers, passing through key events and periods of time including warfare, slavery, colonialism and globalization, as well as many other more recent methods used to control and exploit workers.

Many companies spy on their workforce through the e-mail and Internet, sometimes without their awareness and approval. Instant messaging, text messaging, and social media monitoring are also increasing (Laudon and Laudon, 2018). Many have compared workplaces under monitoring to the Panopticon (Liu,

2017). Ball (2010) identifies three common reasons of e-monitoring (EM): (a) to maintain productivity and monitor resources used by employees, (b) to protect trade secrets, and (c) to provide evidence in case of a legal dispute. Ajunwa et al. (2017) add the implementation of these types of EM systems for improving efficiency and innovation as the fourth factor. Al-Rjoub et al. (2008) add that EM tools provide managers with the ability to continuously evaluate and measure their employee's performance. It implies that employers are capable of micromanaging employees by tracking almost everything. For this reason, we interpret electronic monitoring as any system allowing to track and to supervise every move of e-workers at anytime and anywhere.

The work environment is an elemental site for the development of generic skills such as communication, problem-solving, teamwork, information technology and customer service skills. These skills are crucial in today's workplace because they relate to employability. Beyond, the culture of the workplace needs to support individuals to effectively establish or utilize these skills (Virgona et al., 2003). In the authors' opinion, the ability to develop innovative capacity depends not only on the hard and soft skills, but on the trust, the internal environment of the enterprise and, hence, the up-to-date culture of the workplace. Intrinsic motivation is a triggering element for employees' creativity. During their research, Bernstrøm et al. (2017) concluded that if they are monitored, they are less intrinsically motivated because they feel less trusted. The componential theory of creativity, for example, suggests that an interesting or attractive task or problem increases the employee's tendency to use a creative approach. In other words, the employee tends to search for non-traditional and/or alternative ways of solving work related problems (Amabile et al., 1996, Shin and Zhou, 2017).

In the past, e-workers were selected from among a group of responsible individuals with good behavior. By this act, they were given more freedom from micromanagement. It turns out that e-workers are less prone to misconduct than cubicle workers. Porterfield (2003) recognizes some cases when micromanaging works e.g. line manufacturing occupations where body shapes essentially function as mindless machines. In other words, micromanaging is a great way to reduce job satisfaction, limit creativity, stifle communication, and reduce productivity (Fracaro, 2007).

Workplace surveillance technology is infiltrating the employee's daily environment to monitor their web-browsing patterns, keystrokes, social media posts and even private messaging apps (Solon, 2017). Gartner survey's results found that more than 50% of corporations are using some type of non-traditional monitoring techniques. Further, 30% of employees were agreeable with tracking their mail by employer (Kropp, 2019).

Covid-19 has accelerated workplace change. They moved from clearly-defined physical locations to virtual ones. Modern technology enables managers to manage and to track employees from distant locations. Such daily reliance and dependency on technology has created new issues concerning employee's privacy and has added new stress to the employer-employee relationship (Nord et al., 2006). To evoke positive reactions from employees, Kehinde and Okafor (2019) recommend the organization to inform its employees before the EM implementation. To improve employee performance, many organizations are more and more employing electronic performance monitoring (EPM), the so-called an invisible eye (Bhave, 2014). EPM can be utilized to micromanage workforce and to attack privacy, to reduce their job satisfaction, to boost stress and lead into low-trust and negative work relationships (Schumacher, 2011).

One of the advantages of EM is that it is a useful tool for performance and productivity appraisal and evaluation (Al-Rjoub et al., 2008; Ciocchetti, 2011; TechRepublic, 2005). On the contrary, numerous studies have documented the negative effects of EM on employee morale and productivity. The monitored employees complain that their surveillance results in

paced work, a lack of involvement, a reduced social support from peers and supervisors, and a fear of job loss (Ariss, 2002). Sarpong and Rees (2014) also record that monitoring can be unproductive.

Martin and Freeman (2003) argued that EM creates a "paternalistic" relationship among employers and employees. Lim (2002) adds that employees might feel they are treated like children. But Princi and Krämer (2019) stress that employees who have a trusting relationship with their organization will more likely accept the deployment of an IoT system (Internet of Things implemented as Smart Electronic Monitoring), even if the system is capable of collecting their personal data.

3 Methods

Our research was conducted in two phases. First, a literature review was undertaken that examined scholarly findings on e-working and e-monitoring in the workplace. Second, an e-mail survey was undertaken. The structured questionnaire was based on similar published surveys, in particular, on the Clutch 2020 Employee Productivity Survey (Roddy, 2020) focused on pros and cons of employee monitoring. Our insights were drawn from respondents across the Central European Countries: Austria, the Czech Republic, Hungary, Poland and Slovakia. Our main interest addressed their position towards e-monitoring, inter alia the potential changes in their attitude regarding their electronic monitoring after their move to home offices. As a result, their factual geographical locations were not part of our research interest.

All participants engaged in the e-mail survey were fully informed regarding confidentiality, privacy, sensitivity and data protection. Their participation was voluntary, they confirmed it using a consent form.

3.1 Sample and Sampling procedure

Before the fieldwork was conducted, the survey instrument was pilot-tested between 9 and 30 November 2020. 1000 questionnaires were sent out, with a response rate of 58.5%. Among them, 45.3% of the respondents were male, and the median age was 20–39 years. Out of the respondents, 51.5% were single. The key role of this introductory stage was to form a sample which would only include the employees having jobs requiring an extensive use of computers to accomplish their tasks. Part-time employees and cubicle-only employees were eliminated. Moreover, respondents younger than 20 were omitted. In total, the sample consisted of 585 full time e-workers aged 20 years and above. Consequently, the sample contained a heterogeneous group of professionals working in several areas, including service industry. They all agreed to participate in the next survey under a warranty that their responses to the questionnaire remain anonymous.

3.2 Measures

3.2.1 Monitoring Software

To map the overall situation, the questionnaire started with the following question: "Does your firm utilize Employee Monitoring Software?" The three-point scale was used: yes - no - unsure.

3.2.2 Workplace trust versus Employee Monitoring

Big Brother is becoming increasingly common. Rosengren and Ottosson (2016, p. 182-183) make the point that must be taken seriously, that while new digital technologies do open up certain kinds of monitoring and surveillance, the extent and consequences will necessarily depend on the social fabric interwoven into the organization in terms of culture and trust. We asked respondents: "Would you have more trust in your company, if monitoring software was used to track your work?" The two-point scale (yes - no) was utilized.

3.2.3 Productivity

Al-Rjoub et al. (2008) emphasize that the employee will be more productive when he/she is electronically monitored. Further their results suggest that EM has been accepted by many employees as a technology tools that help in improving the employee's behaviour. The three-point scale (more productive - no effect - less productive) was applied to: "How would Employee Monitoring Software affect your productivity?"

3.2.4 Privacy versus Productivity

The workers are using equipment supplied by their employer for both private and professional purposes. For the companies, it gives the opportunity of implementing software giving them a broader range of control and surveillance over their employees' online activities (Rosengren and Ottosson, 2016). It is increasingly common for employers to track their teams when they are on the clock. When the employees know that the Big brother is watching them, it could mean they waste less time and are more productive. But is that actually the case? The following question has been asked: "Is Employee Monitoring Software reliable?" The two-point scale was used (yes - no).

3.2.5 Demographics

Gender, age, marital status, and employment were used as control variables in the analyses.

3.3 Data Analysis

In the first stage, we used a cross-tabulation of data to examine relationships within the data. In the second stage of our analysis, we used chi-square tests statistics to find out the relationship between the pairs of questions:

- "Does your company use Employee Monitoring Software?" and "How would Employee Monitoring Software Affect your productivity?"
- "Would you have more trust in your company, if monitoring software was used to track your work?" and "Does your firm utilize Employee Monitoring Software?"
- "Would you have more trust in your company, if monitoring software was used to track your work?" and "Is Employee Monitoring Software reliable?"
- "How would Employee Monitoring Software affect your productivity?" and "Is Employee Monitoring Software reliable?"

Additionally, age group and gender has been tested of the following questions:

1. "Would you have more trust in your company if monitoring software was used to track your work?"
2. "How would Employee monitoring Software Affect your Productivity?"
3. "Is Employee Monitoring Software reliable?"

4 Results

4.1 Face-to-Display workers monitoring software findings

The oldest and most common employee monitoring technology is the clock, e.g. 8-hour day, also called the 9-to-5 workday (Duggan, 2021). Generally, it is an inaccurate method because of its focus on quantity of work instead of its quality or achievements. Monitoring of employees activities in their workplace and/or their remote place is a sensitive and often contentious issue. Rosengren and Ottosson (2016) indicate that many of the features of monitoring software are the same as those sold to parents to monitor their children's internet usage. Based on the examined data, only 1/5 of respondents are aware of their organization usage of Employee Monitoring Software to track their activities (see Table 1).

Table 1: Does your company use EMS?

Answer	Number	Ratio
Yes	123	21.0%
No	288	49.2%
Unsure	174	29.8%

Almost half of the e-workers surveyed think their activities are not being tracked by software. A big portion of employees is not familiar whether there is software tracking their activities (29.8 %). The proportion between Yes and No answers is 2/5. Taking this information as an input and extending it to the remaining 29.8% of the unsure ones, one gets an approximate distribution 12/18 (2/3) of Yes/No among the rest. Based on the data and approximation, one can conclude that about 33% of employees are monitored.

Only 1/10 of the face-to-display workers would trust their employer more using EMS as shown in Table 2.

Table 2: Would you have more trust in your company, if monitoring software was used to track your work?

Answer	Number	Ratio
Yes	56	9.6%
No	529	90.4%

It is interesting to observe that all 56 employees responding "yes" belong to the group of 123 those familiar with their tracking in Table 2. This confirms Ball and Margulis (2011) statement that monitoring tends to focus on problems and threats, a coercive supervisory style, rather than on success and empowerment. According to Kehinde and Okafor (2019), 46.5% of employees agree the e-monitoring facilitates an atmosphere of suspicion in the workplace. Table 3 indicates that roughly 4/5 of e-workers state that EM negatively affects their productivity.

Table 3: How would EMS affect your productivity?

Answer	Number	Ratio
More productive	56	9.6%
No effect	67	11.4%
Less productive	462	79.0%

Sarpong and Rees (2014) also report EM's counterproductive and negative impact on employees' productivity, commitment and attendance. They conclude that it could bring about an atmosphere of mistrust and hostility. The presented data emphasizes that the e-workers monitoring can negatively affect productivity. In the same vein, research data from Australia suggests that behaviors towards surveillance in the workplace play a crucial role in establishing whether surveillance systems and practices result in ineffective work behaviours (Martin et al., 2016). Both trust and transparency are core aspects of monitoring in the workplace (Timis and Gabelin, 2020).

Advanced technologies are allowing more diversified and prevalent monitoring and surveillance practices and are becoming more and more interlinked with data collection for the performance evaluation and management (Mateescu and Nguyen, 2019). According to Nord et al. (2006), the e-monitoring reasons range from work-place harassment to a loss of productivity and even to company sabotage. A significant number of employers have been engaged in employee monitoring of various forms: from e-mail monitoring and website blocking to phone tapping and GPS tracking. The companies progressively fuse technology with policy to maintain productivity and minimize litigation, security, and other risks. To ensure conformity with rules and policies, more than 1/4 of employers have dismissed workers for inappropriate use of their e-mail and nearly 1/3 have dismissed employees for incorrect use of the Internet, according to the 2007 Electronic Monitoring & Surveillance Survey from American Management Association (AMA) and The ePolicy Institute (AMA, 2019). E-monitoring seems to be a blocking factor in e-working culture. As Table 4 indicates, the employees do not trust it.

Table 4: Is EMS reliable?

Answer	Number	Ratio
Yes	80	13.7%
No	505	86.3%

More than 4/5 of the face-to-display workers (86.3%) believe that EM software is not reliable as shown in Table 4. This group expects the manager to define the rules and to be target-oriented. At the same time, respondents who were not used to this kind of work culture agree that EM was reliable and effective (13.7%).

As stated by Thorstenson (2020) the productivity rises when employees have the impression that their organization has confidence in them and supports them, further supplies them with training, good project management and adequate resources to get their job done in time. In this case, the spread of Covid-19 caused many organizations problems due to a quick e-working implementation and not preparing a fair e-working culture. We agree with Kehinde and Okafor (2019) that an organization should inform employees before implementation of an EM system to produce positive reactions from employees as well as with Alder (2001) that bureaucratic cultures will answer more conducive to monitoring than supportive cultures.

4.2 Relationships

To learn more about the employees' attitudes, we juxtaposed their responses to the survey questions and provided their analysis.

“Does your company use Employee Monitoring Software?” and “How would Employee monitoring Software Affect your Productivity?”

Based on results of a contingency table of observed counts (see Table 5) those e-employees of companies where tracking software is used do not think that this tool reduces productivity. But all those face-to-display workers whose company does not have tracking software or are unsure about its use think that implementing of it would reduce productivity. It indicates that the companies should be open about their EMS usage and explaining its role to their employees.

Table 5: Observed Counts

Does your company use Employee Monitoring Software		How would Employee Monitoring Software affect your Productivity			Total
		More productive	No Effect	Less productive	
Yes	Count	56	57	0	123
	%	45.5%	54.5%	0.0%	100.0%
No	Count	0	0	288	288
	%	0.0%	0.0%	100.0%	100.0%
Unsure	Count	0	0	174	174
	%	0.0%	0.0%	100.0%	100.0%
Total	Count	56	67	462	585
	%	9.6%	11.5%	79.0%	100.0%

Although Table 5 of observed counts contains zero frequencies, the conditions for a good approximation for the chi-square test of independence are met. All expected counts are higher than 5 (See Table 6).

Table 6: Expected counts

Does your company use Employee Monitoring Software		How would Employee monitoring Software affect your Productivity			Total
		More productive	No Effect	Less productive	
Yes	Count	11.8	14.1	97.1	123.0
	%	27.6	33.0	227.4	288.0
Unsure	Count	16.7	19.9	137.4	174.0
	%	56.0	67.0	462.0	585.0

The P-value of the test is lower than the chosen level of significance, we reject the null hypothesis of independence.

Whether a monitoring system is implemented in the company affects the subjective opinion on productivity (See Table 7).

Table 7: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	585.000 ^a	4	0.000
N of Valid Cases	585		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.77.

The final association has been measured by Cramer's V which equals to 0.707 (see Table 8) which is moderately strong and can be considered as strong relationships between variables.

Table 8: Cramer's V

	Value	Approximate significance
Nominal by Nominal	Cramer's V	0.707
N of Valid Cases		585

“Would you have more trust in your company if monitoring software was used to track your work?” and “Does your firm utilize Employee Monitoring Software?”

All e-employees whose company does not have tracking software or are unsure of its utilization think that its introduction would not increase trust in the organization (see Table 9).

Table 9: Observed counts

		Would you have more trust in your company if monitoring software was used to track your work		Total	
		No	Yes		
Does your company use Employee Monitoring Software	Yes	Count	67	56	123
		%	54.5%	45.5%	100.0%
	No	Count	288	0	288
		%	100.0%	0.0%	100.0%
	Unsure	Count	174	0	174
		%	100.0%	0.0%	100.0%
Total	Count	529	56	585	
	%	90.4%	9.6%	100.0%	

Although the table 9 of observed counts contains zero frequencies, the conditions for a good approximation for the chi-square test of independence are met.

All expected counts are higher than 5 (See Table 10).

Table 10: Expected counts

		Would you have more trust in your company if monitoring software was used to track your work		Total
		No	Yes	
Does your company use Employee Monitoring Software	Yes	111.2	11.8	123.0
	No	260.4	27.6	288.0
	Unsure	157.3	16.7	174.0
Total		529.0	56.0	585.0

The P-value of the test is lower than the chosen level of significance, we reject the null hypothesis of independence (see Table 11). Whether the monitoring system is implemented in the company affects the subjective opinion of trust in the company.

Table 11: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	232.608 ^a	2	0.000
N of Valid Cases	585		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.77.

The final association has been measured by Cramer's V which equals to 0.631 (see Table 12) which is moderately strong and can be considered as strong relationships between variables.

Table 12: Cramer's V

		Value	Approximate significance
Nominal by Nominal	Cramer's V	0.631	0.000
N of Valid Cases		585	

“Would you have more trust in your company if monitoring software was used to track your work?” and “Is Employee Monitoring Software reliable?”

E-workers who think that monitoring software is reliable also believe in 70% that its utilization could increase confidence in the company in which they work. On the contrary, all those who doubt the reliability of monitoring software also do not believe that its implementation could increase confidence in the organization (see Table 13).

Table 13: Observed counts

		Would you have more trust in your company if monitoring software was used to track your work			Total
		No	Yes		
Is Employee Monitoring Software reliable	Yes	Count	24	56	80
		%	30.0%	70.0%	100.0%
	No	Count	505	0	505
		%	100.0%	0.0%	100.0%
Total		Count	529	56	585
		%	90.4%	9.6%	100.0%

All expected counts are higher than 5 (See Table 14).

Table 14: Expected counts

		Would you have more trust in your company if monitoring software was used to track your work			Total
		No	Yes		
Is Employee Monitoring Software reliable	Yes	72.3	7.7	80.0	
	No	456.7	48.3	505.0	
Total		529.0	56.0	585.0	

The P-value of the test is lower than the chosen level of significance, we reject the null hypothesis of independence (see Table 15). Whether e-employees think that monitoring software is reliable affects a subjective view of trust in the company.

Table 15: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	390.922 ^a	1	0.000
N of Valid Cases	585		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.66.

The final association has been measured by Phi which equals to -0.817 (see Table 16) which is strong and can be considered as strong relationships between variables.

Table 16: Cramer's V

		Value	Approximate significance
Nominal by Nominal	Phi	0.631	0.000
N of Valid Cases		585	

“How would Employee monitoring Software Affect your Productivity?” and “Is Employee Monitoring Software reliable?”

Most e-employees (70%) who think that monitoring software is reliable believe that its utilization could increase work productivity. 30% of the respondents think that its utilization has no effect on labour productivity. The vast majority of e-

employees (91.5%), who do not believe in the reliability of the monitoring system, think that its introduction would reduce labor productivity (See Table 17).

Table 17: Observed Counts

		How would Employee monitoring Software affect your Productivity			Total	
		More productive	No Effect	Less productive		
Is Employee Monitoring Software reliable?	Yes	Count	56	24	80	
		%	70.0%	30.0%	0.0%	100.0%
	No	Count	0	43	462	505
		%	0.0%	8.5%	91.5%	100.0%
Total		Count	56	67	462	585
		%	9.6%	11.5%	79.0%	100.0%

Although the table 17 of observed counts contains zero frequencies, the conditions for a good approximation of the chi-square test of independence are met. All expected counts are higher than 5 (See Table 18).

Table 18: Expected counts

		How would Employee monitoring Software affect your Productivity			Total
		More productive	No Effect	Less productive	
Is Employee Monitoring Software reliable	Yes	7.7	9.2	63.2	80.0
	No	48.3	57.8	398.8	505.0
Total		56.0	67.0	462.0	585.0

The P-value of the test is lower than the chosen level of significance, we reject the null hypothesis of independence. Whether e-employees think that a monitoring system is reliable affects a subjective view of work productivity (See Table 19).

Table 19: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	454.523 ^a	2	0.000
N of Valid Cases	585		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.66.

The final association has been measured by Cramer's V which equals to 0.881 (see Table 20) which is strong and can be considered as a strong relationship between variables.

Table 20: Cramer's V

		Value	Approximate significance
Nominal by Nominal	Cramer's V	0.881	0.000
N of Valid Cases		585	

4.3 Age group and gender test results

In the next step, associations between variables (age group and gender) were tested. In the first and third questions, the effect of the answers related to age of those questions was not confirmed as $p > 0.05$, as shown in Table 21 and Table 22.

Table 21: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.224 ^a	2	0.200
N of Valid Cases	585		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 3.92.

Table 22: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.403 ^a	2	0.067
N of Valid Cases	585		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.61.

Related to the productivity, the effect of the answers related to age of the second question was confirmed as $p < 0.05$. People in age group 20-39 think less often than older generations that a monitoring system would reduce their activity (see Table 23 and 24).

Table 23: Observed Counts

			How would Employee monitoring Software affect your Productivity			Total
			More productive	No Effect	Less productive	
Age group	20-39	Count	39	53	254	346
		%	11.3%	15.3%	73.4%	100.0%
	40-60	Count	13	10	175	198
		%	6.6%	5.1%	88.4%	100.0%
	60+	Count	4	4	33	41
		%	9.8%	9.8%	80.5%	100.0%
Total	Count	56	67	462	585	
	%	9.6%	11.5%	79.0%	100.0%	

Table 24: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.206 ^a	4	0.001
N of Valid Cases	585		

a. 2 cells (22.2%) have expected count less than 5. The minimum expected count is 3.92.

The final association has been measured by Cramer's V which equals to 0.125 (see Table 25) which is moderate and can be considered as a moderate relationship between variables.

Table 25: Cramer's V

		Value	Approximate significance
Nominal by Nominal	Cramer's V	0.125	0.001
N of Valid Cases		585	

Further investigation of gender relationships to three questions has not been confirmed. All p-values of the tests are higher than the selected significance level of 0.05 as demonstrated in Table 26, 27 and 28.

Table 26: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.506 ^a	1	0.061
N of Valid Cases	585		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 25.37.

Table 27: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.346 ^a	2	0.114
N of Valid Cases	585		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 25.37.

Table 28: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.671 ^a	1	0.102
N of Valid Cases	585		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 36.24.

5 Discussion

Based on the results of this paper, 1/5 of respondents believe that their employer use employee monitoring software to track their activities. We have shown above why 1/3 is a more reasonable estimation.

To track or not track, that is a question many companies face regardless if employees are working remotely or not. Therefore, monitoring should be more closely examined to find answers for

the following questions: Can we monitor everything? Should we track our talent? How to set the limits to the managers? Should the economic incentive be the main driver?

An investigation undertaken by Atlas VPN indicates that spying a single e-employee costs 7 dollars a month on average (Alex, 2020). 79% of face-to-display workers say monitoring software does affect their productivity (being less productive), comparably almost the same data as Clutch survey (Roddy, 2020). Possibly, the managers who defend EM by boosting productivity in the place of work may want to practice the following: to assuage or to eliminate bureaucracy, to revise all systems and to recognize their high quality employees, to overcome problems, to share their vision throughout the organization, to question the employees and to listen to them carefully, to be honest and to have integrity, to turn their customers into their strategic partners, and to develop effective performance-based pay plans (Moss, 2006). Skeptics also contend that there is no definitive evidence to suggest that productivity decreases because employees may be using electronic devices for non-work purposes (Riedy and Wen, 2010).

Every organization using modern technology at its workplace has got the hardware to implement monitoring. To do the electronic monitoring, any organization needs a "good" reason. The definition of "good" is, of course, unclear and depends on the environment in which it exists and the perceptions of the employees and managers (Sanders et al., 2013). Accordingly, it needs to establish (or revisit) its policies to ensure effective use depending on both sides.

The level of trust is a rule (Benetytè and Jatuliavičienė, 2013) as workplace environments rely more on trust and transparency: treated like adults, employees can do what they want, when they want, provided that the work gets done (Ressler and Thompson, 2010). This corresponds with the traditional workplace motivation theories such as Hackman and Oldham's job characteristics model that originated in 1974 and is still relevant today (Hackman and Oldham, 1974). According to Hackman and Oldham (1976) the employee's intrinsic motivation to perform effectively in their jobs is enhanced by five job characteristics: skill variety, task variety, task significance, autonomy, and feedback. The issue of employee monitoring is mainly concerning autonomy. More recent studies confirm that various forms of autonomy have positive impact on the increase in job performance caused by an increase in intrinsic motivation (Aghion et al., 2013; Beckmann et al., 2017; Bloom et al., 2011). As Deci and Ryan (2000) claim, employees who are trusted, are committed to their employers and demonstrate high intrinsic motivation in their job performance.

6 Conclusion

E-surveillance and e-monitoring in the workplace have developed in parallel with paradigm changes in the manufacturing industry and traditional production operations from the physical to the virtual world. Emerging technologies now enable different types of modern surveillance, often described as an oppressive Panopticon (Leth Jespersen et al., 2007) that could be used for benevolent or immoral aims. Rosengren and Ottosson (2016) say the relationship between trust and monitoring is a two-way street. It is difficult to perceive monitoring without trust as ethical or sustainable (Indiparambil, 2019). Ariss et al. (2002) advise managers to use trust rather than monitoring to increase their workers' performance. This confirms also recent studies about the e-working extension (Beno et al., 2021; Beno and Hvorecky, 2021).

The main research questions investigated in this paper are:

RQ1: *Is better to leave room to e-employees instead of spying them?*

Based on our results, 1/5 of respondents believe that their organization uses employee monitoring software to track their

activities. Almost half of the e-workers consider that their activities are not being tracked by software. Only nearly 1/10 of the face-to-display workers would trust their employer more using EM. Yes, out of 123 official tracked e-employees, only 56 face-to-display workers would trust their employer more using the EM and these workers state that EM does affect their productivity.

RQ2: *Would e-employee monitoring software affect productivity?*

Yes, roughly, 4/5 of e-workers state that EM does affect their productivity. Presented data emphasizes that companies using face-to-display workers monitoring software can negatively affect morale and productivity instead of production of good work. Moreover, Beno and Hvorecky (2021) highlight those who do not feel comfortable with e-work tend to be less productive.

RQ3: *Is e-employee monitoring software reliable?*

E-monitoring seems to be a blocking factor in e-working culture. Almost all e-employees (86.32%) agree that the manager need to define the rules and be target oriented. But those respondents where the employees were not used to this kind of work culture agree that EM was reliable and effective (13.68%).

The primary objective of this paper work was to address the issue of e-monitoring in the e-working environment. It explored the impact of monitoring on e-employees in the digital work environment whether tracking the employees' activities in e-workplace represents an optimal factor in e-working culture. EM started in the past as tracking web browsing, online shopping, checking social media or looking at sports scores. A study by Greenfield and Davis (2002) highlight that the respondents spent an average of 3.24 hours per week on personal Internet usage while at work. Additionally, around 14% of the UK workforce spends almost half of their time on the Internet for personal use (Newcombe, 2013). Modern technology, diversity in technological capabilities and not necessarily ethical outlook (Pitesa, 2012) and e-working enables tracking of employees activities. A recent study highlights the rise of surveillance software (51%) since the start of pandemic (Migliano, 2020). But e-monitoring seems to be a blocking factor in e-working culture. EM can create a lack of trust (Mujtaba, 2003). The Deloitte Global Millennial survey of 2019 found that 55% of millennials plan to leave employers that prioritize profits over people (Deloitte, 2019).

Topics revealed in this paper have implications for future research in the area of monitoring the e-workers. Future researchers must begin by exploring these issues directly with those who face them (a qualitative approach). Important seems to be the post-Covid-19 time of the workplace environment in trying to establish some form of balance or harmony between all parties in the e-working, hybrid and cubicle workplace environment. The authors leave all these questions for future research: Are there individual pros of e-monitoring compared to alternatives?, Will employees agree with the willingly self-monitoring? and can accepted and transparent e-monitoring still be immoral?

This paper has some limitations. Firstly, data gathering occurred by means of e-mail questionnaires because of distance, economic aspects and pandemic. There is no guarantee that the researchers drew all possible information from the participants that could be used in the analysis of the data and results. However, the quality of the data depends upon the quality of the questions asked (Beno and Hvorecky, 2021). Secondly, the sample does not reflect the population by sectoral structure. Thirdly, because of time lack the questionnaire were not translated into mother languages of respondents. Lastly, the researchers have no way of ascertaining whether the respondents replied honestly or not. It should be stated that results from this study do not necessarily reflect how workers used to work (in-house, hybrid or remote) will evolve in the post-pandemic period.

Literature:

1. Aghion, P., Bloom, N., & Van Reenen, J.: Incomplete contracts and the internal organization of the firm. *The Journal of Law, Economics, & Organization*, vol. 30, no. 1/2013, pp. i37-i63. <https://doi.org/10.1093/jleo/ewt003>
2. Ajunwa, I., Crawford, K., & Schultz, J.: Limitless Worker Surveillance, 2017. *105 California Law Review*, 735/2017 Available at: <https://ssrn.com/abstract=2746211>
3. Alder, G. S.: Employee reactions to electronic performance monitoring: A consequence of organizational culture. *The Journal of High Technology Management Research*, vol. 12, no. 2/2001, pp. 323-342. [https://doi.org/10.1016/S1047-8310\(01\)00042-6](https://doi.org/10.1016/S1047-8310(01)00042-6)
4. Alex, T.: It Costs \$7 For Your Boss to Monitor You Working Remotely, 2020. Available at: <https://atlasvnp.com/blog/it-costs-7-for-your-boss-to-monitor-you-working-remotely>
5. Al-Rjoub, H., Zabian, A., & Qawasmeh, S.: Electronic monitoring: The Employees Point of view. *Journal of Social Sciences*, vol. 4, no. 3/2008, pp. 189-195. <https://doi.org/10.3844/jssp.2008.189.195>
6. Allen, T. D., Golden, T. D., & Shockley, K. M.: How effective is telecommuting? Assessing the status of our scientific findings. *Psychological Science in the Public Interest*, vol. 16, no. 2/2015, pp. 40-68. <https://doi.org/10.1177/152910061593273>
7. AMA: The Latest on Workplace Monitoring and Surveillance, 2019. Available at: <https://www.amanet.org/articles/the-latest-on-workplace-monitoring-and-surveillance/>
8. Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M.: Assessing the work environment for creativity. *Academy of Management Journal*, vol. 39, no. 5/1996, pp. 1154-1184. <https://doi.org/10.5465/256995>
9. Ariss, S. S.: Computer monitoring: benefits and pitfalls facing management. *Information & Management*, vol. 39, no. 7/2002, pp. 553-558. [https://doi.org/10.1016/S0378-7206\(01\)00121-5](https://doi.org/10.1016/S0378-7206(01)00121-5)
10. Ball, K.: Workplace surveillance: an overview. *Labour History*, vol. 51, no. 1/2010, pp. 87-106. <https://doi.org/10.1080/00236561003654776>
11. Ball, K. S., & Margulis, S. T.: Electronic monitoring and surveillance in call centres: a framework for investigation. *New Technology, Work and Employment*, vol. 26, no. 2/2011, pp. 113-126. <https://doi.org/10.1111/j.1468-005X.2011.00263.x>
12. Baruch, Y., & Nicholson, N.: Home, Sweet Work: Requirements for Effective Home Working. *Journal of General Management*, vol. 23, no. 2/1997, pp. 15-30. <https://doi.org/10.1177/030630709702300202>
13. Beckmann, M., Cornelissen, T., & Kräkel, M.: Self-managed working time and employee effort: Theory and evidence. *Journal of Economic Behavior & Organization*, vol. 133, 2017, pp. 285-302. <https://doi.org/10.1016/j.jebo.2016.11.013>
14. Benetytė, D., & Jatuliavičienė, G.: Building and sustaining trust in virtual teams within organizational context. *Regional Formation and Development Studies*, vol. 10, no. 2/2013, pp. 18-30. <http://dx.doi.org/10.15181/rfds.v10i2.138>
15. Beno, M.: Transformation of Human Labour from Stone Age to Information Age. In Younas M., Awan I., Ghinea G., Catalan Cid M. (eds), *Mobile Web and Intelligent Information Systems. MobiWIS 2018. Lecture Notes in Computer Science*, vol. 10995, 2018, pp. 205-216. https://doi.org/10.1007/978-3-319-97163-6_17
16. Beno, M.: Four Factors that will shape the Future of Work. *Journal on Advances in Theoretical and Applied Informatics*, vol. 5, no. 1/2019, pp. 1-7. <https://doi.org/10.26729/jadi.v5i1.3114>
17. Beño, M.: The Advantages and Disadvantages of E-working: An Examination using an ALDINE Analysis. *Emerging Science Journal*, vol. 5, 2021, pp. 11-20. Doi: 10.28991/esj-2021-SPER-02
18. Beno, M., & Hvorecky, J.: Data on an Austrian Company's Productivity in the Pre-Covid-19 Era, During the Lockdown and After Its Easing: To Work Remotely or Not? *Frontiers Communication*, vol. 6, no. 641199/2021, pp. 1-10. <https://doi.org/10.3389/fcomm.2021.641199>
19. Beno, M., Hvorecky, J., & Caganova, D.: An Optimal e-working Environment: Online Survey Results. *International*

- Journal of Business and Applied Social Science*, vol. 7, no. 2/2021, pp. 1-10. DOI: 10.33642/ijbass.v7n2p1
20. Bernström, V. H., & Svare, H.: Significance of Monitoring and Control for Employees' Felt Trust, Motivation, and Mastery. *Nordic Journal of Working Life Studies*, vol. 7, no. 4/2017, pp. 29-49. <https://doi.org/10.18291/njwls.v7i4.102356>
21. Bhave, D. P.: The Invisible Eye? Electronic Performance Monitoring and Employee Job Performance. *Personnel Psychology*, vol. 67, no. 3/2014, pp. 605-635. <https://doi.org/10.1111/peps.12046>
22. Bloom, N., & Van Reenen, J. M.: Human resource Management and Productivity. *Handbook of Labor Economics*, vol. 4b, 2011, pp. 1697-1767.
23. Burawoy, M.: *Manufacturing Consent: Changes in the Labour Process Under Monopoly Capitalism*. USA: University of Chicago Press, 1982. 286 p.
24. Ciochetti, C. A.: The Eavesdropping Employer: A Twenty-first Century Framework for Employee Monitoring. *American Business Law Journal*, vol. 48, no. 2/2011, pp. 285-369. <https://doi.org/10.1111/j.1744-1714.2011.01116.x>
25. Deci, E. L., & Ryan, M. R.: The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *Psychological Inquiry*, vol. 11, no. 4/2000, pp. 227-268. https://doi.org/10.1207/S15327965PLI1104_01
26. Deloitte: The Deloitte Global Millennial Survey 2019, 2019. Available at: <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/deloitte-2019-millennial-survey.pdf>
27. Duggan, Ch.: Employee monitoring: to track or not to track?, 2021. Available at: <https://resources.workable.com/stories-and-insights/employee-monitoring>
28. Eurofound: *Living, working and COVID-19*, COVID-19 series. Luxembourg: Publications Office of the European Union, 2020.
29. Foucault, M.: *Discipline and punish: the birth of the prison*. New York: Vintage Books, 1979. 333 p.
30. Fracarò, K. E.: The Consequences of Micromanaging. *Contract management*, vol. 47, no. 7/2007, pp. 4-8.
31. Gajendran, S. R., & Harrison, A. D.: The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology*, vol. 92, no. 6/2007, pp. 1524-1541. <https://doi.org/10.1037/0021-9010.92.6.1524>
32. Greenfield, D. N., & Davis, R. A.: Lost in cyberspace: The web @ work. *Cyber-Psychology and Behavior*, vol. 5, no. 4/2002, pp. 347-353. <https://doi.org/10.1089/109493102760275590>
33. Hackman, J. R. & Oldham, G. R.: *The job diagnostic survey: An instrument for the diagnosis of jobs and the evaluation of job redesign projects*. Department of Administrative Sciences: Yale University, 1974.
34. Hackman, J. R., & Oldham, G. R.: Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, vol. 16, no. 2/1976, pp. 250-279. [https://doi.org/10.1016/0030-5073\(76\)90016-7](https://doi.org/10.1016/0030-5073(76)90016-7)
35. Harrison, D. A., Johns, G., & Martocchio, J. J.: Changes in Technology, teamwork, and diversity: New directions for a new century of absenteeism research. *Research in Personnel and Human Resources Management*, 18(1)/2000, pp. 43-92.
36. Hunton, J. E., & Norman, C. S.: The Impact of Alternative Telework Arrangements on Organizational Commitment: Insights from a Longitudinal Field Experiment. *Journal of Information Systems*, vol. 24, no. 1/2010, pp. 67-90. <https://doi.org/10.2308/jis.2010.24.1.67>
37. Indiparambil, J. J.: Privacy and beyond: socio-ethical concerns of 'on-the-job' surveillance. *Asian Journal of Business Ethics*, vol. 8, 2019, pp. 73-105. <https://doi.org/10.1007/s13520-019-00089-0>
38. Kehinde, O. J., & Okafor, E. E.: The use of electronic monitoring and work performance of employees in the banking industry in Ibadan, Southwest Nigeria. *African Journal of Business Management*, vol. 13, no. 10/2019, pp. 327-342. <https://doi.org/10.5897/AJBM2019.8764>
39. Kirsten, M., & Freeman, R. E.: Some Problems with Employee Monitoring. *Journal of Business Ethics*, vol. 43, no. 4/2003, pp. 353-361. <https://doi.org/10.1023/A:1023014112461>
40. Kiziloglu, M.: A research on the relationship between workplace monitoring and jobs stress. *Journal of Organizational Behavior Research*, vol. 3, no. 2/2018, pp. 1-12.
41. Kropp, B.: The Future of Employee Monitoring, 2019. Available at: https://ink.library.smu.edu.sg/lkcsb_research/5031
42. Kurland, B. N., & Bailey, E. D.: Telework: The advantages and challenges of working here, there, anywhere, and anytime. *Organizational Dynamics*, vol. 28, no. 2/1999, pp. 53-68. [https://doi.org/10.1016/S0090-2616\(00\)80016-9](https://doi.org/10.1016/S0090-2616(00)80016-9)
43. Laudon, K. C., & Laudon, J. P.: *Management Information Systems*. Essex: Pearson Education Limited, 2018. 639 p.
44. Leth Jespersen J., Albrechtslund A., Øhrstrøm P., Hasle P., & Albretsen J.: Surveillance, Persuasion, and Panopticon. In: de Kort Y., IJsselsteijn W., Midden C., Eggen B., Fogg B.J. (eds) *Persuasive Technology. PERSUASIVE 2007. Lecture Notes in Computer Science*, 4744. Springer, Berlin, Heidelberg, 2007, pp. 109-120. https://doi.org/10.1007/978-3-540-77006-0_15
45. Lim, V. K. G.: The IT way of loafing on the job: Cyberloafing, neutralizing and organizational justice. *Journal of Organizational Behaviour*, vol. 23, no. 5/2002, pp. 675-694. <https://doi.org/10.1002/job.161>
46. Liu, Y.: Employee Monitoring: Workplace as a Panopticon?, 2017. Available at: <https://thesiscommons.org/y7m6c/>
47. Martin, K., & Freeman, R. E.: Some problems with employee monitoring. *Journal of Business Ethics*, 43(4)/2003, pp. 353-361. <https://doi.org/10.1023/A:1023014112461>
48. Martin, A. J., Wellen, J. M., & Grimmer, M. R.: An eye on your work: How empowerment affects the relationship between electronic surveillance and counterproductive work behaviours. *The International Journal of Human Resource Management*, vol. 27, no. 21/2016, pp. 2635-2651. <https://doi.org/10.1080/09585192.2016.1225313>
49. Mateescu, A., & Nguyen, A.: Workplace Monitoring & Surveillance, 2019. Available at: https://datasociety.net/wp-content/uploads/2019/02/DS_Workplace_Monitoring_Surveillance_Explainer.pdf
50. Migliano, S.: Employee Surveillance Software Demand up 51% Since Start of Pandemic, 2020. Available at: <https://www.top10vpn.com/research/investigations/covid-employee-surveillance/>
51. Moss, G.: *Business secrets: Guidelines for New Leaders-Managers*. USA: Cengage Learning, 2006. 300 p.
52. Moussa, M.: Monitoring Employee Behavior Through the Use of Technology and Issues of Employee Privacy in America. *Sage Open*, vol. 5, no. 2/2015, pp. 1-13. <https://doi.org/10.1177/2158244015580168>
53. Mujtaba, B.: (2003). Ethical implications of employee monitoring: What leaders should consider. *Journal of Applied Management and Entrepreneurship*, vol. 8, no. 3/2003, pp. 22-47.
54. Newcombe, T.: Employees spend up to half the working day surfing the internet for personal use, says K3 Managed Services, 2013. Available at: <https://www.hrmagazine.co.uk/article-details/employees-spend-up-to-half-the-working-day-surfing-the-internet-for-personal-use-says-k3-managed-services>
55. Nicklin, J. M., Cerasoli, Ch. P., & Dydyn, K. L.: Telecommuting: What? Why? When? and How? In Jungwoo Lee (eds), *The impact of ICT on work*. Singapore: Springer, 2016, pp. 41-70. https://doi.org/10.1007/978-981-287-612-6_3
56. Nilles, M. J., Gray, P., Carlson, F. R., & Hanneman, J. G.: *Telecommunications-Transportation Tradeoff*. National Science Foundation, 1974.
57. Nilles, J. M.: Telework: Enabling Distributed Organizations. *Information Systems Management*, vol. 14, no. 4/1997, pp. 7-14. <https://doi.org/10.1080/10580539708907069>
58. Nilles, J. M.: *Making Telecommuting Happen: A Guide for Telemanagers and Telecommuters*. New York: John Wiley & Sons, 1994.
59. Nilles, J. M.: *Managing Telework: Strategies for Managing the Virtual Workforce*. New York: John Wiley & Sons, 1998.
60. Nord, G. D., McCubbins, T. F., & Horn Nord, J.: E-monitoring in the workplace: privacy, legislation, and surveillance software. *Communications of the ACM*, vol. 49, no. 8/2006, pp. 72-77. <https://doi.org/10.1145/1145287.1145290>
61. Pitesa, M.: Employee surveillance and the modern workplace. *Business Ethics: A critical approach: Integrating*

- ethics across the business world*, 2012, pp. 206-219. Available at: https://ink.library.smu.edu.sg/lkcsb_research/5031
67. Porterfield, R. L.: The perils of micromanagement. *Contract Management*, vol. 43, no. 2/2003, pp. 20-23.
68. Princi, E., & Krämer, N. C.: Acceptance of Smart Electronic Monitoring at Work as a Result of a Privacy Calculus Decision. *Informatics*, vol. 6, no. 3/2019, pp. 19. <https://doi.org/10.3390/informatics6030040>
69. Ressler, C., & Thompson, J.: *Why work sucks and how to fix it*. New York: Portfolio, 2010. 256 p.
70. Riedy, M., & Wen, J.: Electronic surveillance of internet access in the American workplace. *Information and Communication Technology Law*, vol. 19, no. 1/2010, pp. 87-99. <https://doi.org/10.1080/13600831003726374>
71. Roddy, S.: Pros and Cons of Employee Monitoring, 2020. Available at: <https://clutch.co/hr/resources/pros-cons-employee-monitoring#:~:text=Only%2010%25%20of%20employees%20say%20that%20they%20would%20have%20more,used%20to%20track%20their%20work>
72. Rosengren, C., & Ottosson, M.: Employee monitoring in a digital context. In J. Daniels, K. Gregory, & T. McMillan Cottom (Eds.), *Digital sociologies*. Policy Press, 2016, pp. 181-194.
73. Sanders, D., Ross, J., & Pattison, P.: Electronic snoops, spies, and supervisory surveillance in the workplace. *Southern Law Journal*, vol. 23, 2013, pp. 1-27.
74. Sarpong, S., & Rees, D.: Assessing the effects of 'big brother' in a workplace: The case of WAST. *European Management Journal*, vol. 32, no. 2/2014, pp. 216-222. <https://doi.org/10.1016/j.emj.2013.06.008>
75. Schiff, F.: Working at Home Can Save Gasoline, 1979. Available at: <https://www.washingtonpost.com/archive/opinion/1979/09/02/working-at-home-can-save-gasoline/ffa475c7-d1a8-476e-8411-8cb53f1f3470/>
76. Schumacher, S.: What Employees Should Know About Electronic Performance Monitoring. *ESSAI*, vol. 8, no. 38/2011, pp. 138-144.
77. Shin, S. J., & Zhou, J.: Transformational Leadership, Conservation, and Creativity: Evidence from Korea. *Academy Management Journal*, vol. 46, no. 6/2017, pp. 703-714. <https://doi.org/10.5465/30040662>
78. Solon, O.: Big Brother isn't just watching: workplace surveillance can track your every move, 2017. Available at: <https://www.theguardian.com/world/2017/nov/06/workplace-surveillance-big-brother-technology>
79. TechRepublic: Issues to consider when implementing an employee monitoring program, 2005. Available at: <https://www.techrepublic.com/article/issues-to-consider-when-implementing-an-employee-monitoring-program/>
80. Thorstenson, E.: The influence of Working from Home on Employees' productivity, 2020. Available at: <https://www.diva-portal.org/smash/get/diva2:1446903/FULLTEXT01.pdf>
81. Timis, D., & Gabelin, O.: The Rise of Employee Monitoring in the Workplace, 2020. Available at: <https://www.global-solutions-initiative.org/young-global-changers-blog/employee-monitoring-in-the-workplace/>
82. Virgona, C., Waterhouse, P., Sefton, R., & Sanguinetti, J.: Making experience work: Generic skills through the eyes of displaced workers, 2003. Available at: https://www.ncver.edu.au/_data/assets/file/0019/6409/nr1007vol1.pdf
83. Workflexibility: Remote Work or Telecommute: What's the Difference, 2018. Available at: <https://www.workflexibility.org/remote-work-vs-telecommute-whats-the-difference/>

Primary Paper Section: A

Secondary Paper Section: AE, AH, AP

REGIONAL DIFFERENCES IN THE CONTEXT OF LABOR MIGRATION IN THE HEALTH SECTOR

^aSIMONA HYŽOVÁ, ^bMAGDALÉNA TUPÁ

^aAlexander Dubček University in Trenčín, Faculty of Social and Economic Relations, Študentská 3, 911 50 Trenčín, Slovakia

^bAlexander Dubček University in Trenčín, Faculty of Social and Economic Relations, Študentská 3, 911 50 Trenčín, Slovakia

email: ^asimona.hyzoova@tmuni.sk ^bmagdalena.tupa@tmuni.sk

This publication was created within the project APVV-19-0579 Setting up personnel management processes in hospitals and its impact on the migration of doctors and nurses to work abroad.

Abstract: The change in the age structure of the population is causing a global problem - the aging of the population. The aging of the population is linked to many areas of life. It is certainly necessary to think about the area of social care and health care, where it will be necessary to ensure a sufficient number of workers. In recent years, the Slovak Republic has been characterized by an increase in the number of migrant workers. The Slovak Republic is also characterized by large regional differences. That is why the aim of the presented study will be a detailed analysis of the current state of employment of medical staff, migration of medical workforce from Slovakia to abroad, as well as an analysis of regional differences in the migration of medical staff.

Keywords: migration, labor force, healthcare

1 Introduction

Migration is mostly understood as a positive phenomenon, which is caused by the natural development of society. Identifying the development and monitoring of labor migration should be a priority for each country in order to maintain the positive impact of migration on society.

Migration within European countries has increased in the last two decades. International migration over the last half century has significantly affected individual states in Europe (Lanari, Bussini and Minelli, 2018). This is also confirmed by Triandafyllida (2018), who claims that migration has intensified and diversified over the last 25 years.

In the Slovak Republic, labor migration increased mainly after the accession to the European Union in 2004 and intensified even more with the entry of Slovakia into the Schengen area in 2007 (Bahna, 2011; Tupá, Vojtovič, Strunz, 2018). The development of migration in Slovakia can be understood in two directions. On the one hand, Slovakia is a country from which more and more workers are migrating abroad, but on the other hand it suffers from labor shortages in some sectors, which makes Slovakia interesting for immigrants from other countries (Vojtovič, Tupá, 2016).

Labor migration has recently become very resonant throughout society. The demographic changes in the age structure of the population, which have lasted for several years, when the population of the Slovak Republic is aging, and the current situation regarding the outbreak of the global Covid-19 pandemic is an increasingly resonant topic of labor shortages in the health sector.

Not only the current situation associated with the outbreak of a global pandemic but also the demographic development of countries where the main phenomenon today is considered to be the aging of the population emphasizes the need to address the issue of providing health care with sufficient labor. Several authors discuss the need to address the health sector under the influence of an aging population, such as Jakovljević (2017) and Colombier (2018).

With the aforementioned stagnation of the population, the future greater need for labor is expected, especially in the field of health care, with a connection to the current global shortage of health workers, Slovakia's security may be in danger. The previous statement is also confirmed by Dobriansky, Suzman, Hodes (2007) who claim that high unemployment, outflow of labor due to population aging or migration causes cracks and a

shortage of workers in the labor market. There are concerns that caring for a growing aging population that is ill and dependent on support will not be possible (Jayawardana, Cylus, Mossialos, 2019).

The shortage of health professionals on a global scale has long been addressed by several authors such as Bradby, 2014 or Hardy, 2016. It has only become known in the Slovak Republic recently. According to Tupá (2020), the shortage of workers in the healthcare sector has far-reaching consequences, it draws attention to the daily encounters of people looking for either general or specialized doctors.

Trends in international migration also affect the migration of health workers. Healthcare migration is not a new trend. Nurses and doctors have been looking for and are looking for employment abroad for many reasons, including high unemployment in the healthcare labor market in their home country or a lower income compared to other countries. It can be said that more developed countries take the workforce, especially in the health sector, from the poorest countries in the world (Bach, 2003). This is confirmed by Wojczewski et al (2015) who argue that the unequal distribution of health workers contributes to the inefficient functioning of health services in many low-income countries, while several high- and middle-income countries benefit from the migration of skilled health workers.

Labor migration is closely related to regional disparities (Zudelova, Urbancikova, 2014). The goal of almost every country is to reduce the differences in individual regions. In the Slovak Republic, regional differences have already been addressed in various respects by several authors (Grmanová, Kostrová, 2019; Kostrová, 2018; Kordoš, Krajňáková, 2018; Privara, Rievajova, Dziura, 2018; Masarova, Koiso, 2017).

Although in the Slovak Republic there are already partial analyzes of the migration of the medical workforce abroad, the research lacks a focus on regional disparities in the labor force. That is why the aim of the presented study will be a detailed analysis of the current state of employment of health workers, migration of the health workforce from Slovakia to abroad, as well as an analysis of regional differences in the migration of health workers since 2010.

2. Aim, Data and Research Methodology

The aim of the presented study will be a detailed analysis of the current state of employment of health workers, migration of the health workforce from Slovakia to abroad, as well as an analysis of regional differences in the migration of health workers since 2010.

Sub-goals are:

- 1) detailed analysis of the development of workers in the health sector in individual NUTS 3 regions of Slovakia,
- 2) a detailed analysis of labor migration from the Slovak Republic with regard to the migration of health workers at the national level,
- 3) a detailed analysis of the migration of the health workforce at regional NUTS 3 level,
- 4) to find out whether there is convergence or divergence in the number of migrant workers in the health sector in the NUTS 3 regions in the Slovak Republic.

In analyzing the development of the number of employed in the health sector, the number of migrant workers at the national and regional NUTS 3 level, we used data from the DataCube database of the Statistical Office of the Slovak Republic (2020), Health Statistics Yearbook of the Slovak Republic from 2010 to 2018 and Quarterly statistical documents Labour force sample survey from 2010 to 2018 issued by the Statistical Office of the Slovak republic.

To meet the main goal and all partial goals, it was necessary to use the statistical method Beta convergence and the correlation diagram.

β -convergence is one of the methods for measuring convergence, resp. divergence of regions. It is based on the assumption that regions converge if regions that initially had low values grew faster than regions that initially had higher values. If the data in the regions are moving away in a given time horizon, then we are talking about divergence. In our case, the individual NUTS 3 regions of the Slovak Republic are considered regions.

From the given data we construct a scatter plot, where we plot the logarithms of the initial values with the horizontal axis and we apply the logarithms of the average growth coefficients to the vertical axis, the units represent points in the plane. Subsequently, the least squares method determines the equation of the regression line with the dependent and independent variable in the form $y = a + b * x$, where y is the logarithm of the average growth coefficients and x is the logarithm of the initial values.

The dependent variable is the logarithm of the average growth factors and the independent variable is the logarithm of the initial values. If the function of linear regression is decreasing, we speak of convergence. If the linear regression function is increasing, we speak of divergence.

An important step is to calculate the value of the coefficient of determination in percent. It explains how many percent of the total variability is explained by the model. If the value of the coefficient of determination is close to 100, it is considered significant; if it is close to 0, it is considered insignificant (Minařík, Borůvková and Vystřil, 2013).

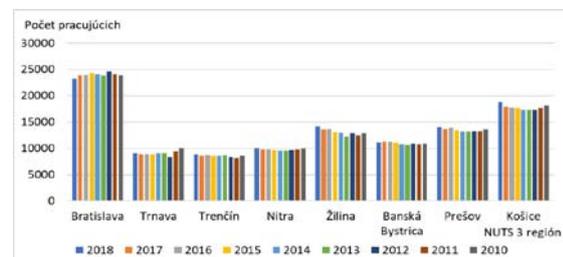
If the results of convergence are insignificant, a correlation diagram is used, which divides the observed regions into four quadrants using two lines. The first line, horizontal, passes through the arithmetic mean of the logarithms of the average growth coefficients. The second line, vertical, passes through the arithmetic mean of the logarithms of the initial values.

3 Research results and discussion

Number of workers in the health sector in the Slovak Republic

The number of workers in the health sector accounts for approximately 7.2% of the total number of workers. In the Slovak Republic, the number of employees according to the SOSR (2020) in the health sector increased by more than 28,000 persons over a period of nine years. We show how many health workers worked in individual NUTS 3 regions of the Slovak Republic in Graph 1.

Graph 1 Number of employees in the health sector in NUTS 3 regions in Slovakia republic



Sours: Data - Health Statistics Yearbook of the Slovak Republic 2010-2018 (2020)

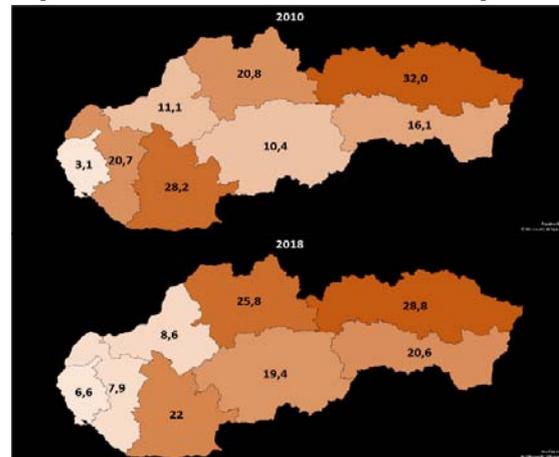
The largest number of health professionals worked in the NUTS 3 region of the Bratislava region, followed by the Košice region and the third place from 2010 to 2017 was the Prešov region. In 2018, the Žilina Region was in third place. While in the Bratislava and Trnava regions the number of workers in the health sector decreased in the other NUTS 3 regions of Slovakia their number increased. We will analyze whether the increasing emigration of the labor force from these regions contributes to

the decline in workers in the health sector in the following part of the study.

Number of workers abroad from the Slovak Republic

In 2018, more than 139,000 inhabitants migrated from the Slovak Republic than in 2010. The number of labor migrants from individual regions can be observed in Graph 2.

Graph 2 Number of workers abroad from the Slovak republic



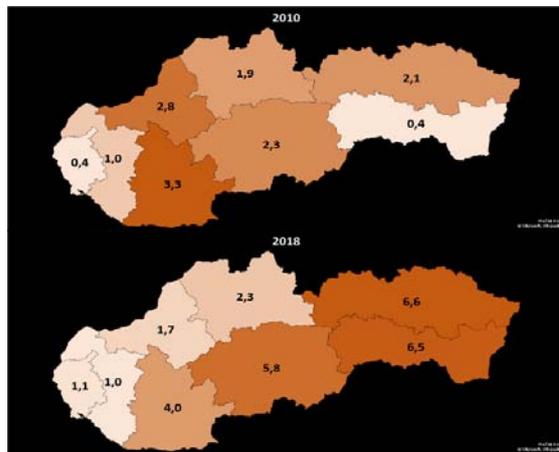
Sours: Data - Quarterly statistical documents Labour force sample survey 2010 – 2018. (2020)

Most people working abroad were in the NUTS 3 region of the Prešov Region during the entire period under review. From the NUTS 3 region, the Bratislava Region worked the least working abroad during the entire monitored period. The reason why the Bratislava Region emigrates the least from the NUTS 3 region for work abroad is that the capital of the Slovak Republic is located in this region, many entrepreneurs are concentrated here to carry out their business activities and thus there are many job opportunities.

Number of workers abroad from the Slovak Republic in the health sector

The development of the number of workers abroad from the Slovak Republic in the health sector had a fluctuating development, but from 2010 to 2018 the number of emigrant health workers increased by almost 15,000. The number of migrant workers from individual regions can be observed in Graph 3.

Graph 3 Number of workers abroad from the Slovak republic in health sector



Sours: Data - Quarterly statistical documents Labour force sample survey 2010 – 2018. (2020)

In the emigration of the labor force, we can observe large regional differences within the territorial division of NUTS 3. As

we can see in Graph 3, in 2010 most workers abroad in the health sector came from the Nitra region. The number of migrant health workers from Slovakia in individual NUTS 3 regions almost exactly copies the differences within the total labor migration in NUTS 3 regions.

In 2018, the emigration of workers in the health sector reflects the overall economic situation within NUTS 3 regions. While in the west of Slovakia fewer workers from the NUTS 3 region emigrate from the health sector in the eastern NUTS 3 regions, the number of emigrant health professionals is noticeably higher. This is mainly due to the economic situation in Slovakia, where the western regions have better conditions on the labor market, better infrastructure, more job opportunities and higher wage rates have been developed.

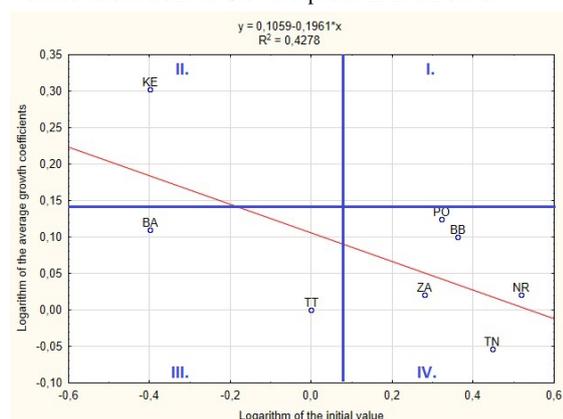
From 2010 to 2018, the number of emigrant workers in the health sector from the NUTS 3 region of the Košice Region increased the most, where their number increased by more than 6,000. The only region where the number of emigrant health workers decreased in the monitored period is the NUTS 3 region Trenčín Region, where from 2010 to 2018 the number of health workers working abroad decreased by more than 1100 workers.

We analyze whether the individual NUTS 3 regions are approaching or receding in the number of emigrant health professionals in the following section.

Convergence of working population abroad in the health sector in NUTS 3 regions of the Slovak Republic

The average growth rate of the number of employees abroad in the health sector was 1.1954. The function of the regression line had the form: $y = 0.1059 - 0.1961x$. It follows from the above that the function of the regression line decreases, thus converging, ie converging regions. The coefficient of determination has a value of 42.78%, which means that 42.78% of the total variability is explained by the model. Because the value of the coefficient is closer to 0, convergence is considered insignificant. In case of insignificance, a correlation diagram is used, which divided the NUTS 3 regions of the Slovak Republic into four quadrants, but the NUTS 3 regions are located in only three quadrants (Graph 4).

Graph 3 Beta- convergence and correlation diagram of number of workers abroad from the Slovak republic in health sector



Sours: Data - Quarterly statistical documents Labour force sample survey 2010 – 2018. (2020)

In the first quadrant there is not one of the NUTS 3 regions of the Slovak Republic. The Košice Region is located in the second quadrant, ie this region has a below-average initial value and an above-average growth rate. It tends to move into the first quadrant. The Bratislava Region and the Trenčín Region are located in the third quadrant, ie in the quadrant where the NUTS 3 regions are located, which lag behind the other regions. These regions have a below-average initial value and a below-average growth rate. In the fourth quadrant there are the most NUTS 3 regions in the Slovak Republic. The regions of Prešov, Banská Bystrica, Žilina, Nitra and Trenčín are located here. There are

NUTS 3 regions of the Slovak Republic, which have above-average initial values and below-average growth values. They tend to move to the third quadrant.

4 Conclusion

The aim of the presented study was to analyze in detail the current state of employment of health care workers, the migration of the health workforce from Slovakia to abroad, as well as to analyze regional differences in the migration of health care workers since 2010.

Based on our analyzes, we can say that in the Slovak Republic from 2010 to 2018, the number of employees in the health sector increased by more than 28,000 people over a period of nine years. While in the Bratislava and Trnava regions the number of workers in the health sector decreased in the other NUTS 3 regions of Slovakia their number increased.

In 2018, more than 139,000 inhabitants migrated from the Slovak Republic than in 2010. During the entire period under review, the majority of people working abroad were in the NUTS 3 region of the Prešov Region, the least in the Bratislava Region.

The development of the number of workers abroad from the Slovak Republic in the health sector had a fluctuating development, but from 2010 to 2018 the number of emigrant health workers increased by almost 15,000. In labor emigration, we can observe large regional differences within the territorial division of NUTS 3. The number of migrant health workers from Slovakia in individual NUTS 3 regions almost exactly copies the differences within the total migration of labor in NUTS 3 regions. From 2010 to 2018, the number of emigrant workers in the health sector from the NUTS 3 region of the Košice Region increased the most, where their number increased by more than 6,000. The only region where the number of emigrant health workers decreased in the monitored period is the NUTS 3 region Trenčín Region, where from 2010 to 2018 the number of health workers working abroad decreased by more than 1100 workers.

NUTS 3 regions of the Slovak Republic had a tendency to converge in our observed period, ie there was a convergence of regions. NUTS 3 regions are located in three quadrants. Although convergence is taking place, large regional disparities are still visible and this issue should be constantly addressed by experts and efforts should be made to reduce regional disparities even more.

This paper can serve as a basis for further scientific research in the context of labor emigration and also as a basis for addressing the issue of investigating the causes and effects of migration of doctors and nurses to work abroad.

Literature:

1. Bahna, M. Migrácia zo Slovenska po vstupe do EU. 1. vyd. Bratislava: Veda, 2016, 219 s. ISBN 9788022411967
2. Bach, S. International migration of health workers: labour and social issues. Geneva: Sectoral Activities Programme, International Labour Office. 2003. [online]. [cit. 2020-10-11]. Available on: <https://www.hrresourcecenter.org/node/154.html>
3. Bradby, H. International medical migration: A critical conceptual review of the global movements of doctors and nurses. Health. [online]. 2014; 18 (6): [cit. 2020-11-10]. Available on: <https://doi.org/10.1177/1363459314524803>.
4. Colombier, C. Population ageing in healthcare – a minor issue? Evidence from Switzerland. In Applied Economics. 50(15). 2018. pp. 1746-1760. ISSN 0003-6846.
5. Database of Statistical office of the Slovak republic DataCube[online]. 2020. [cit. 2020-10-11]. Available on: <http://datacube.statistics.sk/>
6. Dobriansky, P. J., Suzman, R. M., Hodes, R. J. Why Population Aging Matters. In A Global Perspective. National Institute on Ageing, National Institute of Health, 2007. 32 p.

7. Hardy, J. et al. Scaling the mobility of health workers in an enlarged Europe: An open political economy perspective. *European Urban and Regional Studies*. [online]. 2016; 23 (4): [cit. 2020-11-10]. Available on: <https://doi.org/10.1258/j.srp.2012.012018>.
8. Jakovljević, M. Population ageing alongside health care spending growth. In *Serbian archives of medicine*. 145(9-10). 2017. pp. 534-539. ISSN 0370-8179.
9. Jayawardana, S., Cylus, J., Mossialos, E. It's not ageing, stupid: why population ageing won't bankrupt health systems. In *European Heart Journal - Quality of Care and Clinical Outcomes*. 2019. 5(3). pp. 195-201.
10. Kordoš, M., Krajňáková, E. Significance of innovation in Slovak regions - issues and challenges In: *Ad alta-journal of interdisciplinary research*, 8(1). 2018. pp. 137-141. ISSN 1804-7890.
11. Kostrová, J. Regional disparities in context of working migration in the Slovak Republic In: *RELIK 2018 : Reproduction of human capital - mutual links and connections. The 11th international scientific conference. - Prague : University of Economics*, 2018. p.163-172. ISBN 978-80-245-2281-4.
12. Lanari, D., Bussini, O., Minelli, L. The Effects of Immigrant Status and Age at Migration on Changes in Older Europeans' Health. In *International Migration Review*, 52 (4). 2018. pp. 1218-1249. ISSN 0197-9183.
13. Masárová, J. Koišová, E. Identification of the conditions (potential) for the development of potential clusters in the conditions of regions of the Slovak Republic. In *AD Alta Journal of interdisciplinary research*, 7(2). 2017. pp. 103-107. ISSN 1804-7890.
14. Minářík, B., Borůvková, J., Vystrčil, M. *Analýzy v regionálním rozvoji. Příbram: Professional Publishing*, 2013. 244 p. ISBN 978-80-7431-129-1
15. Privara, A., Rievajová, E., Džjura, B. Unemployment Aspects of Regional Development (The Cases of the Czech and Slovak Republics) In *Advanced Science Letters*, 24(9). 2018. pp. 6320-6322(3). ISSN 1936-6612.
16. Statistical Office of the Slovak Republic. *Health Statistics Yearbook of the Slovak Republic 2010- 2018*. [online]. [cit. 2020-11-10]. Available on: <https://slovak.statistics.sk/>
17. Statistical Office of the Slovak Republic. *Quarterly statistical documents Labour force sample survey 2010 – 2018*. [online]. [cit. 2020-11-10]. Available on: <https://slovak.statistics.sk/>
18. Triandafyllidou, A. *Handbook of migration and globalisation. United Kingdom: Cheltenham*. 2018. 487 p. ISBN 978-1-78536-750-2.
19. Tupá, M. Personálne zabezpečenie systému zdravotníctva v Slovenskej republike kvalifikovanými sestrami v kontexte pracovnej emigrácie. In *Zdravotnícke listy*. 8(1). 2020. pp. 38-46. ISSN 1339-3022.
20. Tupá, M., Vojtovič, S., Strunz, H. Zmeny na trhu práce v SR a migrácia pracovnej sily. In *Zborník odborných príspevkov z medzinárodnej vedeckej konferencie Vplyv Industry 4.0 na tvorbu pracovných miest*, 2018. s. 209-216. ISBN 978-80-8075-837-0.
21. Vojtovič, S., Tupá, M. Evaluation of Economic Benefits from Migrated Labour Force. In: *3rd International Multidisciplinary Scientific Conference on Social Sciences and Arts SGEM 2016: Political Sciences, Law, Finance, Economics and Tourism*, 2(8). 2016. pp. 229-236. ISBN 978-619-7105-76-6.
22. Wojczewski, S. et al. Diaspora engagement of African migrant health workers – examples from five destination countries. In *Global Health Action*. 8 (1). 2015. ISSN 1654-9716.
23. Zudelova, M., Urbancikova, N. Labour migration and mobility in the districts of the Slovak Republic. In *5th Central European Conference in Regional Science (CERS)*. 2014. Pp. 1198-1208.

Primary Paper Section: A

Secondary Paper Section: AO

IMPLEMENTING NEW TRENDS NOT ONLY IN PERSONNEL COMMUNICATION WITH SCARCE PROFESSIONS ON LABOUR MARKET IN THE CONTEXT OF TECHNOLOGY INTERFERENCE

^aJAROSLAV BEDNÁRIK, ^bJANA CHARVÁT JANECHOVÁ

*The Faculty of Mass Media Communication, University of
Ss. Cyril and Methodius in Trnava, Nám. J. Herdu 2, 917 01
Trnava, Slovakia*

email: ^a jaroslav.bednarik@ucm.sk, ^b charvat.janchova1@ucm.sk

The research was supported by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences (VEGA, No. 1/0458/21) under the project entitled "Management of the "groundswell" concept by business entities in promotion of environmentally-friendly products in times of technology interference".

Abstract: The paper deals with the area of personnel marketing, which is being formed as an independent scientific discipline, bringing marketing approach into human resources management. Globalisation of the labour market, digitization and technology interference, growth of competition in individual sectors bring along numerous innovations in personnel marketing, which found their place in personnel corporate communication. The aim of the submitted study is to examine application of new trends in personnel communication mix by personnel officers who represent entrepreneurial subjects on the Slovak and Czech labour markets, mainly in the context of addressing professions of short supply. The object of investigation is the way of work with the professional social network LinkedIn and attitudes of human resources officers related to this tool.

Keywords: personnel marketing, human resources, social networks, technology interference, employer, employee, labour market, LinkedIn.

1 Introduction

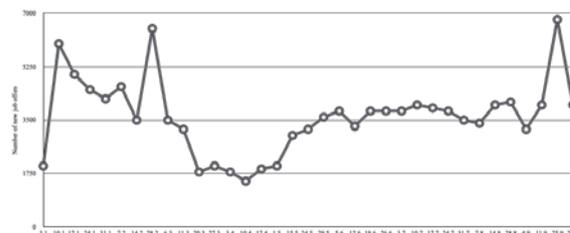
Recently, we have seen an increase in the number of companies in various sectors of the economy using innovative methods to acquire and retain qualified and motivated employees. Experienced workers know how to get orientated in employment offers and choose the best one. They are aware that they will receive more proposals. Companies thus take advantage of market opportunities, present themselves at conferences and work fairs, and actively communicate with the public with the intention of being an attractive employer with a strong brand. Investments in retaining current members of the workforce are becoming a relatively common practice. The supply of employees' benefits that organizations compete with each other is governed by the needs of the members of the staff and is often the results of outputs obtained from workers' satisfaction surveys. The effort to acquire quality human resources, reduction of fluctuation and maintaining employee satisfaction and work motivation lead corporations to firmly integrate personnel marketing into the corporate strategy. The expected prerequisite is to capture the use of professional social networks in the personnel marketing of companies, especially in the context of addressing scarce professions in the labour market using modern tendencies.

2 Personnel marketing as a way out of the situation on the labour market

The beginning of human resources marketing can be traced especially there, where traditional advertising of the work offer is no longer enough and it is necessary to involve marketing tools to increase the attractiveness and work position proposals of the employer. This is the result of cooperation between traditional marketing and personnel management. Armstrong (2015) considers human resources management as a managerial approach that makes use of people's efforts, skills and dedication to do the work in a way that secures the organization's future. Assuring the right human resources in the environment of a changing economy and growing competition is often a key competitive advantage for companies. If we involve the marketing approach into the personnel area, especially for the formation, maintenance of the necessary workforce of the organization, which is based on the good reputation of the employer and the labour market research, it is personnel marketing (Koubek, 2015). We can therefore understand it as an approach that brings marketing principles to human resources management.

The situation on the labour market creates the need to innovate lines of action in the field of human resources management and to seek a synergistic effect with marketing so that the company's communication is coordinated and participates in the building of the employer's image. It is necessary to perceive workers or jobseekers as the organization's customers, to look at the employee from the same perspective as traditional marketing looks at the consumer (Myslivcová, 2019). Orientation of personnel marketing together to potential and current manpower can help the employer to increase competitiveness in the labour market. However, it should be a well-thought-out and targeted concept that is a part of the corporate strategy. In this context, we can identify with the position of Bednárík and Málíková that personnel marketing is functional and effective when it is in line with the company's personnel policy, corporate culture and corporate communication (Bednárík, Málíková, 2016).

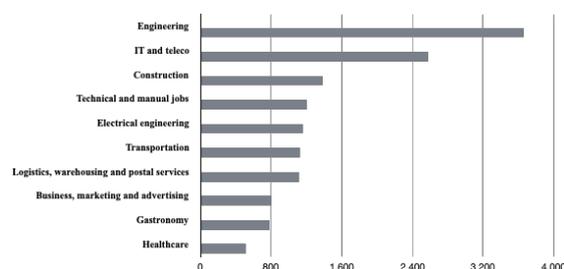
Graph 1: Development of new work offers during monitored weeks (year 2020).



Source: Internet Labour Market Guide (2020). Vectorized by authors.

The labour market saw a drop-in work position proposal in the first half of 2020, mainly under the influence of the Pandemic and related government measures. The statistics published by the Internet Labour Market Guide shows that the number of new employment offers is reaching pre-pandemic supply after the spring slump. The increase in job offers is most pronounced in the areas of engineering, information technology, telecommunications and construction. According to the sources from the recruitment agency Grafton, it is also qualified professions that are in demand by employers and are in short supply (Grafton, 2020). As mentioned below, the market needs programmers, specialists in electrical engineering, electronics, mechanical engineering, and logistics.

Graph 2: Increase in new vacant job offers in September according to working areas (TOP 10).



Source: Internet Labour Market Guide (2020). Vectorized by authors.

The provision of qualified and loyal employees, which are scarce on the market, creates increased demands on human resources management and naturally leads to the application of a marketing approach to the external labour market. The boom in digital technologies has brought new trends to external personnel

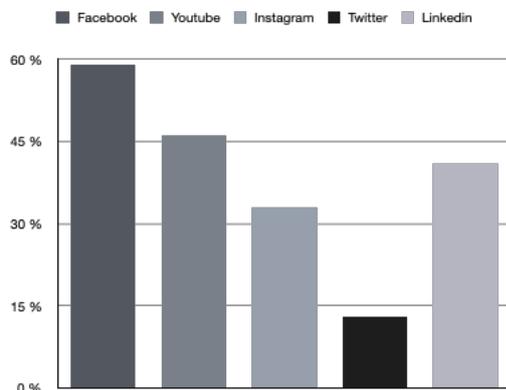
marketing (Švec et al., 2018). The move of the labour market to the online environment is putting pressure on employers to deal more consistently with the presence of their brand in the Internet environment.

3 Social networks in the personnel marketing mix of employers

The expansion of the social networks has brought new opportunities in personnel marketing to address prospective employees. Some social media should be avoided if a business entity wishes to project a certain image of itself. Certain types of social media can be useful only for a very specific group of users, while some social media can even give the impression of dishonesty and unprofessionalism (Madleňák, 2020). Social networks enable not only to effectively inform potential jobseekers about work position vacancies, but also to directly search for and approach those suitable jobseekers whose profiles are publicly available on social media (Šikýř, 2017). It can be deduced from the statement that social networks are a database of information about a potential employee for the employers, they make it possible to better target the work offer and also expand the possibilities of advertising from the local market to the global one.

A survey of social networks in the corporate environment carried out by the agency Neopublic on a sample of the Top 100 firms that have the highest revenues, according to Finstat, shows the percentage representation and use of individual networks (Neopublic, 2020). Communication on social networks differs significantly across industries and up to 36% of the companies do not use any social network.

Graph 3: An overview of social networks used by TOP 100 companies.



Source: Neopublic (2020), vectorized by authors.

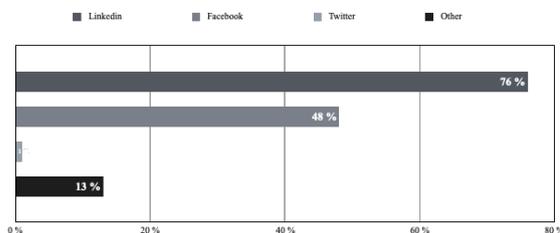
In some sectors, such as telecommunications, food chains or banking, this is a necessity given by the nature of the business. However, there are branches resistant to the trends or exploiting the potential of social networks on a minimum degree. This includes manufacturing sector, power engineering or heavy industry. In this regard, we can agree with Armstrong (2015) that online recruitment is faster and cheaper than traditional advertising, it provides more detailed information about work positions and organizations, and allows electronic processing of employment applications and résumés. The introduction and implementation of social networks in external personnel communication with potential candidates presupposes that human resources management is able to use these tools and is ready to address operational challenges, such as immediate response to the offer, interactive communication, adapting the supply on the basis of the audience response, but also strategic challenges, such as building the employer's brand or actively reaching out to passive candidates with more advanced search tools.

4 Professional network LinkedIn in the service of employers

The rise of the Internet has brought the migration of the labour market to the online environment. It has become common practice to advertise an employment offer on special work-offering portals and social networks of the employer. The job offers and interaction with the potential employer thus took on a completely different dimension. The professional social network LinkedIn was established in 2003 with the intention to enable jobseekers to find work and companies to offer employment. The firm entered the year 2020 with 690 million users in more than 200 countries, making it the largest professional social network in the world. LinkedIn is one of the most popular and largest social networks for people involved in recruitment and researching the labour market, as well as an effective means of building personnel and professional brands (Tegze, 2019). These data point to the fact that the social network LinkedIn has a firm place in the field of human resources management and its profile on the labour market has surpassed the reach of other networks, such as Facebook or Twitter. The results of a study on self-presentation and recommendations for finding workers in the online environment, published in 2015 by a team of authors, confirm the clear dominance of LinkedIn over other social networks. When recruiters want to search potential job candidates, professional SNS (e.g., LinkedIn) profiles may serve as an extended online résumé that allows applicants and recruiters to exchange detailed job-related information at low cost and without the legal or ethical issues associated with private SNSs (e.g., Facebook) (Johannes Kuo-Huie Chiang, Hung-Yue Suen, 2015).

Currently, 612,000 registered users in Slovakia are listed, which represents 11.2% of the total population. The most represented group is aged 25 to 34 years. These data show that the social network LinkedIn has a significant presence on the Slovak labour market and should be considered when creating a personnel communication mix.

Graph 4: Use of social networks in job searching.



Source: Grafton (2020), vectorized by authors.

The results of a survey conducted in the first half of 2020 on a sample of 2,756 respondents by the agency Grafton show that 82% the respondents are looking for work on the Internet. Of those, who use the Internet to look for work, 41% choose social networks. If we focus on a detailed view, we find that LinkedIn significantly dominates among the respondents (Grafton, 2020). This fact is an argument for employers to consider the operation of their company on this social network.

5 Methodology

For the elaboration of the theoretical part, domestic and foreign sources were used, which focus on the topic of personnel marketing, especially in the context of communication with scarce professions in the labour market and technological interference. It was also based on bibliography devoted to innovations in personnel communication and their introduction into the personnel marketing mix. The selection of sources was guided by the principles of topicality and relevance, mainly in relation to the issues addressed.

The practical part of the paper was represented by research, the aim of which was to find out how much the professional social network LinkedIn has been applied in the personnel marketing

mix of employers and what attitudes towards it are taken by human resources professionals from various areas of industry. We assumed that companies would prefer more "traditional" tools of personnel communication and professional social networks would not be among the tools used.

We obtained key information from the primary source, i.e., from human resources officers representing companies from different fields of entrepreneurship. The online questionnaire was sent directly to the personnel officers in selected organizations that have created accounts on the social network LinkedIn and publish work offers in the Czech and Slovak labour markets. The selection of companies that were directly addressed in the data collection process presented representation in a wide range of business areas so that no industry was left out.

Using a survey in the form of a questionnaire, we wanted to find out whether employers who publish job offers on the social network LinkedIn use this tool regularly, what number of customers they have and whether they examine the candidate's profile before inviting them to an interview. We were also examining what importance they attribute to this tool as a part of personnel communication. In addition, we asked about the suitability of the social network LinkedIn in approaching the desired target group and the possibility to change the job offer according to the audience's reaction. We also researched the importance of LinkedIn in building an online reputation and image of an employer. Finally, we were looking for the answer to the appropriateness of the LinkedIn tool for involving employees in creating and commenting on the content, along with the suitability of LinkedIn for creating a database of potential job seekers.

Anonymous answers were collected through the Survio application during January and early February 2021. The research addressed 197 human resources officers, with 84 of the surveyed providing answers. The relevance of the obtained data was ensured by the exclusion question, when we excluded from the sample respondents without experience with publishing a work position offer. Subsequently, we adjusted the sample for respondents who stated that they checked their LinkedIn account only occasionally. The sample was cleaned to 30 respondents.

6 Work results

Out of the sample of 84 personnel officers, only 30 of them reported their experience with publishing a vacancy via the social network LinkedIn. The questionnaire was completed when declaring inexperience with posting a job offer, thus 54 of the surveyed were excluded from the sample. Out of 30 respondents who declared experience with publishing vacant work positions and regularity in checking the account, 46.7% (14) stated that their LinkedIn social network account had more than 500 subscribers; 30% (9) claimed more than 100 subscribers and less than 50 subscribers were reported by 23.3% (7) respondents. 20 of the surveyed perform a daily account check (66.7%); 9 (30%) check the account one a week; 1 (3.3%) respondent checks the account once a month. To the question of looking at the candidate's profile before being invited for an interview, 83.3% (25) of the human resources officers were in favour, and the rest of the sample answered negatively. This was followed by a question on the evaluation of the statements about the social network LinkedIn using a five-point scale. 21 agreed or totally agreed with the assessment of the social network LinkedIn to be an important part of the professional communication (70%); 8 (26.7%) stated the dependence of the evaluation on the situation and one respondent (3.3%) disagreed with the statement. 23 (76.7%) of the surveyed are of the same opinion on the statement that LinkedIn allows to approach the desired target group; 7 (23.3%) respondents stated the reliance of the evaluation on the circumstances. Out of the total number of 30 human resources officers, 22 (73.3%) concur that LinkedIn enables to change the work position offers according to the market situation; seven respondents (23.3%) stated that the assessment depends on the situation and one (3.3%) disagreed with the statement. The same group of 26 (86.6%) respondents spoke positively about the

statements declaring that LinkedIn is significant in building an online reputation and creating the employer's image. In both questions, 4 (13.3%) respondents expressed dependence on the circumstances. On the question of the appropriateness of LinkedIn as a tool for employee involvement in the content creation and commenting, 14 (46.7%) of the surveyed were positive; 15 (50%) declared dependence on the situation and one (3.3%) disagreed with the suitability of workers' involvement in commenting the content of the corporate account on LinkedIn. 80% (24) of the personnel officers agreed with the statement on LinkedIn's appropriateness to set up a database of potential candidates for vacant work positions, the statement was to be evaluated in relation to situation according to 20% (6) of the human resources officers.

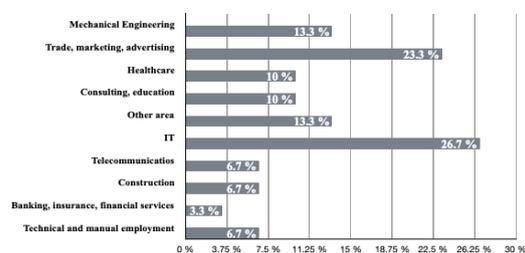
The representation of industry areas showed an even manifestation across all sectors. The most represented areas of business were the IT sector, marketing and advertising, according to 50% (15) of the personnel officers. The final question was devoted to the age structure of the respondents, where 66.7% (20) indicated belonging to the Generation Y (Millennials); 30% (9) to the Generation X and one (3.33%) respondent indicated the Generation Z.

Tab. 1: How much do you agree with the statements about the social network LinkedIn?

	I totally agree	I agree	Depending on the situation	I do not agree	I do not agree at all
It is an important part of personal communication.	10	11	8	1	0
It allows me to reach the target group that is in demand for me.	12	11	7	0	0
It allows you to change the job offer according to the market reaction.	4	18	7	1	0
It is important in building an online reputation.	10	16	4	0	0
It is important in building an employer's image.	13	13	4	0	0
It is a suitable tool for involving employees in creating and commenting on content.	5	9	15	1	0
It is suitable for creating a database of potential job seekers.	10	14	6	0	0

Source: Bednárik and Charvát Janechová (2021).

Graph 5: In what area of industry do you work?



Source: Bednárik and Charvát Janechová (2021), vectorized by authors.

7 Discussion

This study dealt with the ways of how employers can take advantage of new trends not only in personnel communication with scarce professions in the labour market in the context of technology interference. It put forward the issue of the labour

market changes due to the first wave of the Pandemic in the spring 2020, which collapsed under the pressure of the government actions, with the curve of the vacancy growth rising again since September 2020. It also discussed the transfer of the labour market to the online environment and the position of the social networks in the personnel marketing mix of the employers and their implementation in addressing prospective employees. We believe that the research confirmed the aim of the paper. The human resources officers representing entities operating on the Slovak and Czech labour markets implement new trends in the personnel communication mix in the context of approaching professions of short supply. Furthermore, when examining the results of the research, we found out that the representation of the social networks in the communication mix of the companies in the sectors of manufacturing, power engineering, or heavy industry is minimal and rather exceptional. In investigating this phenomenon, the question arose as to how resistance to modern tendencies in the personnel communication will manifest itself in an effort to attract a scarce profession with the work position offer, as well as the generation taking up their first employment. The issue of attitudes to the social network LinkedIn pointed to the clear benefits in terms of building the employer's image, creating an online reputation, as well as the suitability of this tool in setting up a database of prospective jobseekers. When researching the implementation of the social network LinkedIn in the personnel communication, we came to the issue of the extent to which the personnel officers are able to respond flexibly to the market changes and to include professional social networks in the personnel marketing mix, helping to build the company's image and its online reputation. The research has shown that there is no clear belief in involving employees in commenting on the content of the employer's social networks. However, the question remains how and whether this phenomenon can be regulated in the context of technology interference. We believe that deeper follow-up research will bring new insights.

8 Conclusions

The social changes brought about by government measures are affecting the labour market and direct employer's efforts to attract a quality and motivated workforce to the online environment. Restrictions on face-to-face meetings, as well as mandatory remote working, can affect the area of external personnel marketing and direct employers' communication to social networks and specialized job portals (Bezáková et al., 2021). Especially those companies that are struggling with a shortage of young, qualified employees should consider operating on social networks the generation entering the first work position is open to communication technologies, naturally tending to brands and employers who follow trends and communicate in the same way as they do. It can be assumed that the application of the professional social networks will continue to grow, as we have demonstrated with the examples from the market environment research. The dynamic growth in the number of social network users creates a natural pressure on the business environment and it is possible to predict a change in the approach to the use of new trends in personnel marketing communication also in the context of addressing professions of short supply. The topic of professional social networks and their implementation in the personnel communication of employers is topical issue that requires further research, which could bring a broader view.

Literature:

1. Armstrong, M.: *Řízení lidských zdrojů*, Praha : Grada Publishing, a.s., 2015. 48, p. 277. ISBN 978-80-247-5258-7.
2. Bednárik, J. – Málíková, I.: *Lidské zdroje a personální marketing v podnikatelské praxi*. Trnava : UCM v Trnave. 2016. p. 105. ISBN 978-80-8105-825-7.
3. Bezáková, Z. – Madleňák, A. – Švec, M.: Security risks of sharing content based on minors by their family members on social media in times of technology interference. *Media Literacy and Academic Research*, vol. 4, no. 1, 2021, p. 53-69. ISSN: 2585-8726.

4. Bodnar, J. - Cohen: *The B2B Social media book*. Hoboken : John Wiley & Sons, Inc., 2012. p. 89. ISBN 978-11-1816-776-2.
5. Grafton.: *Prehľad najžiadanejších profesií z pohľadu zamestnávateľov*. 2020. Available at: <https://www.grafton.sk/sk/pre-uchadzacov/trendy-a-prehlady-platov/trh-prace/prehľad-najžiadanejších-profesií-zo-strany-zamestnávateľov>.
6. Chiang J. Kuo-Huie - Hung-Yue Suen.: Self-presentation and hiring recommendations in online communities: Lessons from LinkedIn. *Computers in Human Behavior*, vol. 48, 2015, p. 516-522. ISSN: 0747-5632.
7. Internetový poradca trhom práce.: *Vývoj voľných pracovných miest sa stabilizoval, najviac nových ponúk prináša Nitriansky kraj*. 2020. Available at: <https://www.istp.sk/clanok/15590/vyvoj-voľnych-pracovnych-miest-sa-stabilizoval-najviac-novych-ponuk-prinasa-nitriansky-kraj>.
8. LinkedIn.: *Rozšírené vyhľadávani*. 2020. Available at: <https://www.linkedin.com/feed/>.
9. LinkedIn marketing solution blog.: *How to Build Your Employer Brand on LinkedIn!* 2020. Available at: <https://business.linkedin.com/marketing-solutions/blog/linkedin-b2b-marketing/2019/brand-awareness-build-on-linkedin>.
10. Koubek, J.: *Řízení lidských zdrojů: základy moderní personalistiky*. Praha : Management Press. 2015. p. 160. ISBN 978-80-7261-288-8.
11. Madleňák, A.: Social media as an opportunity for S-commerce development at the time of Covid-19 pandemic. In: Kvetanová, Z., Bezáková, Z., Madleňák, A. (eds.): *Marketing identity*. Trnava : FMK, 2020, p.400 ISSN: 2729-7527. Available at: <https://fmk.sk/download/Marketing-Identity-2020-eng.pdf>.
12. Myslivcová, S.: *Personální marketing v řízení lidských zdrojů*. Brno : Muni Press., 2019. 19 p. ISBN 978-80-210-9357-7.
13. Napoleoncat.: *Uživatelia LinkedIn Slovensko*. 2020. Available at: <https://napoleoncat.com/stats/linkedin-users-in-slovakia/2020/11>.
14. Neopublic.: *Ako TOP 100 slovenských firiem využíva sociálne siete*. 2020. Available at: <https://neopublic.sk/ako-top-100-slovenskych-firiem-vyuziva-socialne-siete/>.
15. Stratégie.: *LinkedIn len ako zdroj pre pracovné príležitosti? Zabudnite!* 2020. Available at: <https://strategie.hnonline.sk/blogy/2097579-linkedin-len-ako-zdroj-pre-pracovne-prilezitosti-zabudnite>.
16. Šikýř, M.: *Nejlepší praxe v řízení lidských zdrojů*. Praha : Grada Publishing, a.s., 2017. p. 100. ISBN 978-80-247-5212-9.
17. Švec, M. – Horecký, J. – Madleňák, A.: GDPR in labour relations – with or without the consent of the employee? *AD ALTA : Journal of Interdisciplinary Research*, vol. 8, no. 2, 2018, p. 281-286. ISSN: 1804-7890.
18. Tegze, J.: *Jak hledat zaměstnance v 21. století*. Praha : Grada Publishing, a.s., 2019. 185, p. 229. ISBN 978-80-271-0551-9.

Primary Paper Section: A

Secondary Paper Section: AJ, AE

UTILIZATION OF MODERN METHODS IN MEASURING THE FINANCIAL PERFORMANCE OF THE COMPANY

^aANNA JACKOVÁ

*University of Žilina, Univerzitná 8215/1, 010 26 Žilina
email: "Anna.Jackova@pd.uniza.sk"*

This paper has been written the support of VEGA 1/0544/19 – Formation of the methodological platform to measure and assess the effectiveness and financial status of non-profit organizations in the Slovak Republic.

Abstract: Most entrepreneurs associate their financial performance with the achieved financial results. Each of them wants to be the best and the most successful in their industry and they need to achieve the best possible results. Therefore, it is necessary for them to monitor their financial performance. Except traditional methods of evaluating financial performance (financial analysis), they also focus on modern evaluation methods which consider not only accounting but also economic profit which also takes the alternative cost of capital.

Keywords: financial performance, measurement of financial performance, modern methods of financial performance measurement.

1 Introduction

In today's challenging competitive environment, one of the most important conditions for a company's long-term existence is its adequate financial performance. Measuring financial performance is an integral part of a company's financial management, which seeks to achieve a balance between financial performance and the company's financial structure. It is well known that deciding on the financial structure is one of the key and most complex tasks of a company's financial management. One of the main arguments in support of this statement is the fact that neither financial theory nor practice provide a universal guide, a generally acceptable recommendation for the composition of a company's financial resources. Each company is a unique organism with different characteristics. Its financial structure, taking into account the needs of the company and adequate capital requirements while ensuring the conditions of financial stability and sustainability, depends on a number of external and internal factors.

There are various indicators to measure a company's financial performance. In the past, the evaluation used mainly classic, traditional indicators of financial analysis, which are aimed at maximizing accounting profit. These indicators are compiled on the basis of accounting and tax regulations. These may include a certain safeguard, whether for the state or consumers. Criticism of traditional profitable quantities and financial indicators based on them can be summarized in the following points: "orientation on the past, neglect of economic effects after the end of the period, lack of capture of intangible assets and failure to take into account the cost of capital invested in the company," (Dluhošová, 2010, p. 18). Today's modern performance indicators capture economic profit and draw attention to the business owner and the maximum evaluation of his investment.

2 Financial performance of the company

Financial performance is the way in which a company can use assets from its core business and generate revenue. Through it, the company is able to influence other activities related to the financial management of the company. This term is also used as a general measure of the overall financial health of a company for a given period. "Financial performance is everything that takes place in the company and sooner or later it will be reflected in the financial results of the company, which are represented by the relevant financial indicators," (Lukáč et al., 2017, p. 12).

It is very important for the company, due to the constantly growing competition in the market, to continuously monitor its financial performance and know what its current position and financial situation was and where it was heading with its development. Measuring financial performance provides

information that helps business managers make better decisions. What is measured is easier to manage and control.

Measuring the financial performance of a company evaluates the course of the business process from two perspectives - in terms of the link between this process and the company's goals (efficiency) and in terms of the rationality of its course (effectiveness). It is a specific type of evaluation characterized by purpose orientation. They differ in relativity and subjectivity. Relativity requires that reality be compared with expected developments; subjectivity means that the measurement is influenced by the person who performs it. The measurement is partial if it is carried out during the business process.

Several authors comment on measuring the financial performance of companies. Teplická and Daubner characterize the measurement of financial performance "as a process of quantifying the effectiveness and efficiency of a particular action," (Teplická, Daubner, 2013, p. 7). Both of these authors also identified the basic features that characterize the process of measuring a company's financial performance. Basic features:

- Using a variety of measurements for company performance - financial, non-financial, internal, external, performance, results.
- The process is linked to the company's strategy, not isolated.
- It affects the environment of the company through various measures, which are implemented based on the results of performance measurement. Therefore, the process is part of the planning and controlling processes in the company.
- The process evaluates the impacts of business activities on the company's environment (internal and external).

"Measuring financial performance as a process has its rightful place in the company. Within its position, at the beginning is the vision, mission, philosophy and values that the company professes. When a company knows where it wants to go, what it wants to achieve, it can set a strategy. It also implies a long-term goal for the company, which should be achieved through the strategy. Setting goals is important for a company because it moves it forward and avoids the stagnation. The company's goals are achieved through business activities and processes that must be well planned in advance. Since the company needs to know whether and how the goals were met or not met, it is necessary to measure them (measuring financial performance). These results are the basis for comparing the plan with reality, and on the basis of this comparison, the company is able to determine the causes for the failure - why the given objectives were not achieved. Based on this, the company determines the strategy for the next period. It knows what to improve and what measures to take to improve the company's financial performance (financial performance management)," (Teplická, Daubner, 2013, p. 7).

3 Modern methods of measuring the financial performance of the company

Modern methods of measuring the financial performance of the company were created on the basis of criticism of previous traditional methods. Most of their indicators are based on accounting methods and procedures that do not always correspond to the economic view of the company's financial performance. In addition to accounting profit, modern methods also work with economic profit, the costs of which are made up not only of accounting costs but also of alternative costs, which are called opportunity costs.

The most frequently used and most popular indicators of measuring the financial performance of a company through modern methods:

- Return On Net Assets (RONA),

- Economic Value Added (EVA),
- Cash Return On Gross Assets (CROGA),
- Cash Flow Return On Investment (CFROI).

3.1 Return On Net Assets (RONA) indicator

RONA, a frequently used indicator of return on net assets in practice, is the first indicator of measuring the financial performance of a company through modern methods. This indicator of modern methods indicates how a company performs in comparison with other companies in the industry. It shows how well the company uses its resources and how it is able to make various decisions to ensure the viability of the company as a whole. It is an important measure of a company's profitability.

The indicator is calculated as the ratio of net profit after tax and net assets, ie the sum of fixed assets (non-current assets) and net working capital. Net working capital is a term that refers to current assets after deducting current liabilities. From the above it is possible to derive a formula in the form:

$$\text{RONA} = \text{net profit after tax} / (\text{fixed assets} + \text{net working capital})$$

This indicator belongs to the group of value indicators and is often used in practice. "It is based on a proportional analysis of the financial output and the resources spent on this output. The financial output is considered to be profit after tax and the volume of outputs is considered to be net assets, which are defined as the sum of fixed assets and working capital," (Kislingerová, 2010, p. 122).

Since the return on net assets (RONA) measures the change in the company's wealth (net income) relative to net assets, it is possible to compare the change in net assets with total net assets and obtain a rate of financial return.

This indicator is closely related to another indicator belonging to modern methods of measuring the financial performance of the company - EVA. If the value of the RONA indicator is greater than the value of the WACC (weighted average cost of capital), the value of the EVA indicator is positive. Conversely, if the value of the EVA indicator is negative, if the value of the RONA indicator is less than the WACC. The reason is that the EVA indicator equals $(\text{RONA} - \text{WACC}) * \text{invested capital}$.

3.2 Economic Value Added (EVA) indicator

EVA is the second and very important indicator. It was developed commercially in 1982 and gained recognition precisely for its innovative way of looking at the real profitability of the company. The basic principle of the EVA indicator is to evaluate the performance of companies on the basis of economic value, which managers and owners add to the business and return to owners. Unlike traditional methods of measuring financial performance, EVA focuses on the residual profitability of a company, which is adjusted for the direct cost of debt and also the indirect cost of equity. An enterprise is not truly profitable unless it makes a return on the capital invested in excess of the cost of capital opportunities.

Basic formula for calculating the EVA indicator:

$$\text{EVA} = \text{NOPAT} - \text{WACC} * \text{C}$$

where:

NOPAT = Net Operating Profit After Taxes

WACC = weighted average cost of capital in decimal (% * 1/100)

C = Capital (long-term invested capital)

Parameter C represents long-term invested capital. It is the sum of equity and interest-bearing borrowings. Alternatively, the value of C can be calculated as the sum of fixed assets and net working capital.

According to (Bartošová et al., 2018, pp. 112 - 113), the EVA indicator can be calculated in up to three ways. The first is the

calculation of the EVA entity indicator, which is calculated after adjusting the basic formula as follows:

$$\text{EVA1} = \text{EBIT} * (1-t) - \text{WACC} * \text{C}$$

where:

EBIT = earnings before interest and taxes

(1-t) = EBIT after tax

WACC = weighted average cost of capital in decimal (% * 1/100)

C = Capital (long-term invested capital)

WACC * C = weighted average cost of the enterprise to raise total capital

The second method of calculating the EVA indicator is as follows:

$$\text{EVA2} = \text{PVH} * (1-t) - \text{WACC} * \text{C}$$

where:

PVH = operating profit

WACC = weighted average cost of capital in decimal (% * 1/100)

C = Capital (long-term invested capital)

WACC * C = weighted average cost of the enterprise to raise total capital

Compared to the previous design of the EVA indicator, there has been a change in the PVH parameter, which characterizes the company's production strength. The EBIT indicator is replaced by the PVH indicator, the value of which can be obtained directly from the profit and loss statement.

The third and final method of calculating the EVA indicator shows the efficiency of the investments made on the basis of quantification of the amount by which the value of the company increased in the observed period. The calculation method is as follows:

$$\text{EVA3} = \text{VK} * (\text{ROE} - \text{NvK})$$

where:

VK = equity of the company

ROE = return on equity in decimal (% * 1/100)

NvK = cost of equity (opportunity cost of shareholders - market capitalization rate) in decimal (% * 1/100)

The simplest way to calculate the EVA is this third calculation, as it does not require the weighted average cost of capital. This means eliminating the amount of adjustments that each analyst perceives subjectively.

The EVA indicator also has its recommended values. If $\text{EVA} > 0$, the company is considered successful with a good financial situation. The middle gray zone occurs when $\text{EVA} = 0$, then the company was able to produce only the amount that was invested. And finally, the worst case scenario for the company is if $\text{EVA} < 0$, ie. that the value for owners/shareholders has decreased.

3.3 Cash Return On Gross Assets (CROGA) indicator

The indicator CROGA (cash return on gross assets) is another modern method of evaluating the financial performance of the company or. return on gross assets. The indicator works with the operating cash flow of the company (cash flow) and not with the profit like most indicators. The operating cash flow itself is created through the main business activity of the company and is expressed as the sum of profit and depreciation.

"The use of gross assets in the denominator of the GROGA indicator eliminates the distortion resulting from the use of book residual prices," (Zalai et al., 2010, p. 146).

This indicator can be calculated according to the formula:

$$\text{CROGA} = \text{OATCF} / \text{GA}$$

where:

OATCF = Operating After Tax Cash Flow

GA = Gross Assets

The result of the CROGA indicator is compared with the WACC indicator. If the result of the CROGA indicator is higher than the result of the WACC indicator, the company creates value for the owners.

3.4 Cash Flow Return On Investment (CFROI) indicator

The last of the mentioned indicators from the group of modern methods of measuring the financial performance of the company is the CFROI indicator - return on investment based on cash flows. It was created by the American company HOLT Value Associates and expresses an estimate of the real rate of appreciation of the company's gross investment base through cash flows.

The indicator expresses financial performance, similarly to the ROA (Return on Assets) indicator for the company as a whole, ie regardless of the financing structure. The conceptual difference between ROA and CFROI is that CFROI is based on cash flows and ROA is based on profit or loss. The rule is that the value of this indicator should be higher than zero.

A simplified form of the formula of this indicator according to (Zalai et al., 2008, p. 254) is in the form:

$$\text{CFROI} = \frac{\text{CF before tax + interest}}{\text{(fixed assets + net working capital)}}$$

Fixed assets specified in the formula are valued at historical (acquisition) prices. The CFROI indicator should be subject to the condition that the company should in the following years "achieve a constant volume of operating cash flow, in an amount that is identical to the cash flow in the period under review," (Vochozka, 2011, p. 32).

4 Conclusion

Only a company whose management can face changes in the business environment will gain long-term success and a stable position on the market. Therefore, continuous evaluation of the financial performance of companies becomes a key and irreplaceable tool of financial management of each company in order to constantly look for ways to improve it.

The approach to assessing the financial performance of a company has undergone a significant change in recent decades, which was mainly the transition from traditional methods to the preferred modern methods. The reporting capacity of traditional financial performance indicators, based on information from previous years, does not provide an objective view of the potential growth of a company's financial performance in the future. Therefore, in assessing the future success of the company, indicators are used that prioritize measuring the financial performance of the company in terms of increasing its value.

The topic of financial performance of a company has long been one of the most important problems addressed by theory and business practice.

Literature:

1. Bartošová, V., Jaroš, J., Valášková, K.: *Manažment podnikových pasív*. Žilina: EDIS. 2018, 147 p. ISBN 978-80-5541461-4.
2. Dluhošová, D. a kol.: *Finanční řízení a rozhodování o podniku*. Praha: Ekopress, 2010. 225 p. ISBN 978-80-86929-68-2.
3. Kislíngerová, E. *Manažerské finance*. Praha: C. H. Beck, 2010, 811 p. ISBN 978-80-7400-194-9.
4. Lukáč, J., Rozkošová, A., Lukáč, J.: *Finančná a ekonomická výkonnosť v kontexte malých a stredných podnikov v krajinách V4*. Bratislava: TypoPress, 2017. 210 p. ISBN 978-80-8129-082-4.
5. Teplická, K., Daubner, M.: *Meranie výkonnosti prístupom Balanced Score card. Manažment podnikania a vecí verejných*. Volume 8, Number 21. Bratislava: Slovenská akadémia manažmentu, 2013, 6-14 p. ISSN 1337-0510.
6. Vochozka, M.: *Metody komplexného hodnotení podniku*. Praha: Grada, 2011. 248 p. ISBN 978-802473647-1.
7. Zalai, K. a kol.: *Finančno-ekonomické analýzy podniku*. Bratislava: SPRINT, 2008. 385 p. ISBN 80-89085-99-6.
8. Zalai, K. a kol.: *Finančno-ekonomické analýzy podniku*. Bratislava: SPRINT 2, 2010. 446 p. ISBN 978-80-89393-15-2.

Primary Paper Section: A

Secondary Paper Section: AH

SOVIET LAW AND THE NATIONALISATION OF CHURCH PROPERTY ON THE EXAMPLE OF THE LVIV SEMINARY DURING THE SOVIET AND GERMAN OCCUPATION OF 1939-1945

^aPAVLO KHOMIAK, ^bLYUDMYLA STRILCHUK

^{a,b} Faculty of History, Political Science and National Security,
Lesya Ukrainka Volyn National University, 24 Shopena str.,
Building 4(D), 43005 Lutsk, Ukraine.
emails: ^apaolo.chomiak@gmail.com,
^bstrilchuk.lyudmyla@vnu.edu.ua

Abstract: The attitude of the clergy and faithful of the Catholic Church during the Soviet regime (1945-1991) had a great influence on the preservation and survival of religiosity and the national identity of many people in the territory of the USSR. Thanks to the heroic attitude of the clergy and laity, who, by exposing themselves to the danger of arrest and labor camps, were able to be martyrs of the 20th century of the Soviet regime, the faithful received sufficient spiritual support and kept their faith. The article aims to present selected aspects of the social and religious life of the Roman Catholic community of Lviv in the Soviet Union in the years 1945-1991. The main question is the presentation of the attitude of the Lviv clergy towards the Soviet authorities in 1945-1991 and the covert pastoral activity among the faithful.

Keywords: Church, Lviv churches, priests, the Soviet Union, the Soviet law.

1 Introduction

The issue of nationalization of church property during the Soviet and German occupation of 1939-1945, remains acute and open to Ukraine today. In addition to violent appropriation of church heritage by state authorities, there were a number of actions that were approved at the state level. However, despite the legislative law, such deeds were cruel in relation to people and clerics.

The article reveals the key problems of the process of nationalization of church property on the example of the Lviv seminary. The aspects of the transformation of committed action are highlighted. And also analyses the activities of the Roman Catholic Church during the World War II.

Relevance of the topic consists in insufficient coverage of this issue in Ukrainian historiography. So far, some facts and documents remain inaccessible to free access. The purpose of this study is a comprehensive analysis of the activities of the occupying regimes in Ukraine, on the example of the Lviv Theological Seminary; determining the legality of the nationalisation of church property and the subordination of the work of the church to Soviet authorities.

2 Literature review

The main aspects of the coverage of key issues of the article are analysed on the basis of such sources and works of researchers as: Constitution of the USSR, Vatican Council II, N. Belyakova (2008), B. Mikhalevsky (2007), R. Dzvonkovski (2003), O. Dzera (1996), A. Hlebovich (1991), S. Bizun' (1994), A. Glovacki (1997). These researchers were engaged in the study of the laws of Soviet power on religion and church, covered the position of religion in the Soviet period. The analysis of Moscow documents "About the Religion and the Church, collection of documents" (1963), "Lviv Church Cathedral, documents and materials 1946-1981" (1992) was important during the study of the topic.

However, a comprehensive approach to the study of the church activity during the reign of the occupying regimes was not carried out. Based on the available sources of information, the general provisions on the work of the Roman Catholic Church and its ministers during the German and Soviet occupation were analysed and formed in this article.

Researchers who studied the situation of religion in Ukraine during the Soviet period: J. Krętosz (2004), J. Zimny (2000), J. Volchanski (1995), J. Cherniakievich (1987), J. Krukovski (1993). In addition, these works cover reliable information about the lives of the priests and the acts committed by the Soviet and German authorities in relation to the clergy. The article

comprehensively analyses the attitude of the Soviet and German authorities to religion in general and to its individual clergies taking into account individual aspects which are covered in the above-listed publications.

3 Result and discussion

On 10 June 1918 the first Soviet Constitution was approved, on which all relations of the state were built. Paragraph 13 states that every person has the right to freedom of conscience, so the church is separated from the state and the school from the church. Also, the law allows freedom of religious or anti-religious propaganda. The separation of state from Church and school from Church becomes the basis for the anti-Catholic struggle of the Soviet state. That is why the Constitution of the USSR treats believers and non-believers unequally. Only freedom of worship is guaranteed to believers, whereas freedom of atheistic propaganda is guaranteed to non-believers. The teaching and religious education of children and young people up to the age of eighteen was banned. Public teaching of religion in general was forbidden.

On January 23, 1918, a decree of the People's Commissars was signed. One of the points of the above decree stated that all ecclesiastical and religious communities are subject to the general rules on private associations and do not enjoy any privilege or support from the State, nor from local and autonomous institutions. These associations have no ownership or legal personality. In subsequent legislative acts the name church association was replaced by the name group of believers. All church property was nationalised.

The Instruction of the People's Commissariat of 28 August 1918 stipulated that a minimum of twenty persons (twenties) constituted a group of believers who could obtain registration for worship activities and receive the use of the building and property necessary for worship. This committee was the entity running and responsible for the church. Under Soviet law, a priest was only employed by this committee. The activities of such a group were limited and subject to strict control by the state administrative authorities. Through nationalisation, church property and equipment became the property of the state. According to state law, the church was managed not by a priest - the parish priest - but by the so-called "twenties". The "twenties" had to sign a contract with the state to rent the church, keep an inventory of religious objects. Also, to inventory new objects donated or from other institutions, objects of worship that is not the private property of citizens. The state had the right to completely control the activities of the committee. Many times, the violation of this unjust agreement was associated with great consequences, up to and including the closure of the church.

The next Constitution comes into being in 1936, as the fruit of the First Congress of the Councils of the USSR. Chapter X of this Constitution contains the rights and duties of USSR citizens. The aim of this chapter was to secure religious freedom for every citizen; therefore, the church was separated from the state and with it from the school.

At first sight, it seems that religious freedom in the Soviet state is based on the Constitution, but this is an illusion. However, it gives to these principles its own interpretation completely different from that adopted in democratic states based on liberal ideology. Characteristic of the USSR's constitutional system was the lack of basic equality of citizens irrespective of religion. Consequently, citizens who manifested themselves as believers were treated worse than other non-believing citizens. In public life, people who manifested their religious beliefs were unfit for to take up positions in political life. Believers were restricted in their parental rights: they could not bring up their children

according to their religious beliefs, in civil matters, as they could not defend their good name offended by communist propaganda. In 1977, the next supplemented Constitution of the USSR was issued, but there are no changes concerning religion or church matters. What is characteristic of this amended Constitution is that it gives more right to atheistic propaganda or atheistic activities of various kinds.

The tactics of the Soviet authorities against the Church and the clergy were based on their own legislation and other additional instructions. In accordance with the Constitution, separation of the State from the Church, also the separation of schools from the Church, confiscation of Church property, imposition of high taxes on religious communities in order to close such communities, closure of churches and their use for various purposes: warehouses, sports halls, clubs, animal beehives; the liquidation of Catholic schools, ban on preparations for the priesthood in the Soviet Union, liquidation of holidays.

The Catholic Church on the territory of the USSR was deprived of any legal personality. The attitude of the communist regime towards the Catholic Church was political monism. This monism assumed that the only force guiding the life of society was to be the communist party. All social forces, including Church institutions, were to be subordinated to the communist party ruling over the whole society. Hence, the extent to which the Church exercised its freedom to exercise its functions in the communist state was limited by the state authorities both by law and administratively.

In Soviet law, the state owned all church property, assets and even liturgical vessels. Also, Soviet law had no term for a parish, a deanery or a diocese, all of which were referred to as places of worship” and the clergy as “servants of worship”. Every ecclesiastical institution, on the territory of the Soviet Union, was treated as a private association registered at the request of twenty people, but even they had no legal personality. Virtually all churches as private associations in the USSR were treated equally. In practice, the degree of freedom of individual churches varied depending on their degree of submissiveness to the Soviet authorities. The greatest degree of freedom was enjoyed by the Russian Orthodox Church, although this is a separate and rather broad topic.

The Soviet authorities tried in every way possible to destroy any manifestation of religiousness. Administrative and criminal repressions were used, propaganda fought, and the activities of the security apparatus focused on so-called operational work. This term is used to describe the process of active disclosure and processing of people, facts and issues in order to prevent, recognise and detect hostile activity.

The most widespread method was the nationalisation, “assimilation” of the church, seminary and religious property. The Catholic Church, in the eyes of the atheist regime, was an ideological enemy with large estates and no chance of survival. The material basis of the Church was hit above all. In December 1939, church property was nationalised. Therefore, every effort was made to destroy not only the Latin rite Church, but also the Armenian and Greek Catholic Church. On the shoulders of the remaining priests of the Archdiocese of Lviv fell the task of protecting the long-standing Catholic tradition that had manifested itself in the various nations and cultures living in Lviv. The time of Soviet occupation was an exceedingly difficult time for the Catholic Church and especially for the Lviv archdiocese. Before World War II, the Lviv archdiocese comprised 416 parishes, which consisted of 28 deaneries, and 1,079,108 Catholics. The city of Lviv, which was once called *urbis catholicissima*, had more than 30 Roman Catholic churches before World War II, and only 4 after the war.

As a result of the World War II, more than 30 per cent of the pre-war Polish state and 90 per cent of the territory of the Archdiocese of Lviv, and from these lands 6 units of church administration, found themselves within the borders of the USSR. These included significant parts of the Vilnius and Lviv

archdioceses, the Peremyshl archdiocese, and the entire Diocese of Lutsk. Within the borders of the USSR were about 560 parishes, including 346 from the archdiocese of Lviv, 140 from the diocese of Lutsk and 75 from the diocese Peremyshyl. As a result of various actions on the part of the Soviet authorities, 2492 clergymen of various confessions left Ukraine, and 434 clergymen of various confessions left Zazbruchansk Ukraine. It can be assumed that Roman Catholicism predominated among the clergy of various denominations. Despite all difficulties, trips to the West, despite the liquidation of parishes and religious and ecclesiastical institutes, many priests decided not to leave the territory of the USSR and people.

In addition to high taxes on the functioning of churches, the next stage of the struggle was the elimination of all religious symbols (crosses, paintings) from school buildings, chapels were closed and religious books were withdrawn from libraries. The reorganisation of schooling on the Soviet model was followed by atheist indoctrination. Attempts to isolate young people from the Church in the first half of 1940 were fostered by the abolition of religious holidays and the introduction of a six-day allowance, which made regular attendance at Sunday mass difficult. Catechisation for primary school pupils was carried out at parishes. A striking fact was the liquidation of the faculty of theology at the Jan Kazimiezh University in Lviv. Increasing repressions on the part of the Soviet and German occupants caused considerable confusion in the functioning of the entire social life, including the Church and the seminary.

On February 5, 1940, the professors and alumni of the Major Seminary, together with the Faculty of Theology in Lviv, were expelled by the Soviet authorities from their seminary. After which they found accommodation in monasteries, vicarages and private houses on the territory of Lviv, continuing their theological studies in such an almost clandestine way. With the German occupation the conditions for the functioning of the Seminary, and with it the Faculty of Theology, improved considerably. Therefore, already in July 1941, the Lviv seminary regained its former building, which had been nationalised by the Soviet authorities. On September 2, 1941, another academic year began, to which not only candidates sent home by the Soviet authorities, but also new candidates were admitted. It should be noted that the German authorities forbade the admission of theology students for the first year. According to this decree, students could only be taken on to complete their education accepted before 1939. It is worth noting that from the academic year 1941-1942 there were no major changes in the composition of the lecturers. After the murder of Rev. Dr. W. Komornicki on the Vuleckie Hills and the death of Rev. Prof. Stefan Leon Skibnievski, Rev. Dr. Franciszek Koniechny (and Rev. Dr. Marian Rekhovich) became the new lecturers. From September 1942 the lectures on Biblical Studies were taken over by Fr W. Prokulski SJ. From 1944 Fr Koniechny was replaced by Fr M. Renkas. The result of the activities of the Seminary and the Faculty of Theology during the German occupation was the reception of the sacrament of priesthood by 23 alumni.

Having learnt about the disobedience of the order by the seminary authorities, the German authorities entered the seminary buildings and ordered to leave it to all the students who did not show the document of taking over from 1939. A tragic blow for the seminary was the fact that on 27 January 1942 the Germans arrested the rector of the seminary, Fr. Dr. Stanislaw Frankel, the vice-rector Stanislaw Bizun’, and four of the seminary’s alumnus. One of the greatest merits of Fr. S. Frankel was that he recovered part of the seminary buildings and reactivated the normal cycle of studies. One of the charges by the Gestapo was, to denounce and prove Fr. S. Frankl, that he had given a patriotic sermon to the seminarians during the Christmas holidays. As a result, from November 1942, Fr. S. Frankl was in the prison hospital on Bilinski Street and was later transferred to Zamarstyn. On 15 April 1943 he was freed by a Home Army unit and remained in hiding. On 26 June 1944 he died of tuberculosis in the Reformati monastery in Lviv. He was buried in the Janovska Cemetery in Lviv under the name “Jan Gliniecki”. After the arrest of Fr. S. Frankel, the clerical

authorities did not appoint a new rector, these duties were performed by Fr. S. Bizun' until June 1945. Only in September 1945 Fr. J. Stepa was appointed as the new rector.

4 Conclusions

Despite numerous difficulties and persecutions during the World War II, 76 priests graduated from the Lviv seminary. It is worth noting that part of the ordination took place in the seminary church in Lviv in complete secrecy and with the windows covered. After the end of the World War II, the new Soviet government cancelled the Lviv seminary again in September 1945. After the last ordination of 8 new priests, which took place in the Church of Our Lady of Thorns on 21 September 1945, the seminarians and their superiors left Lviv on 15 October 1945 for new quarters at the Bernardine Monastery in Kalvaria Zebzhydovska.

On 10 June 1948, a report on the religious situation in Ukraine came out, drawn up by the Council for Religious Cults, in which the opinion was repeated several times that the priests who remained in the territory of present-day Ukraine were spies for the Vatican and that their work was directed against Soviet power and aimed at anti-Soviet activities.

It must be said that after Stalin's death in 1953, the Soviet authorities no longer used such macabre forms of struggle against the Catholic Church involving the extermination of the clergy. A semblance of "freedom of the Soviet citizen" was applied but the authorities used other methods which, however, led to the same goal, namely the atheisation of Soviet society. There was a Council for religious affairs in the Supreme Soviet of the USSR, whose main task was to control religious life throughout the country and to apply various kinds of legal provisions that prevented the free exercise of pastoral duties. On the spot, this office was held by a so-called confessional who, in close cooperation with the KGB (Soviet Police), decided whether this priest would be allowed to work or not. Therefore, similar orders of the Soviet regime could not be left without a reaction of the hierarchs of the Catholic Church. In its limited capacity, the Church could not oppose the atheistic regime with its militant anti-church propaganda. As a result, a large number of churches were closed or blown up, and a large number of priests were arrested or deported to Kazakhstan, some giving their lives.

Literature:

1. Albert Z., *The murder of Lviv professors in July 1941*. Wrocław. 1991. P. 19–21.
2. Belyakova N. Inviolable stock. *From the history of registration of religious associations in Ukraine and Belarus in 1976-1986*. www. Religious Studies Digest, 02.09.2008, P. 1.
3. Bizun' S. History marked with a cross. *Memoirs of the life of the Catholic Church in the Lviv Land 1939-1945*. Lublin. 1994.
4. Cherniakievich J. Repatriation of the Polish population from the USSR 1944-1948. Warsaw. 1987.
5. *Collection of documents*. About the Religion and the Church. Moscow. 1963.
6. *Constitution of the USSR*. Article 124. Chapter X. Moscow. 1936.
7. *Documents and materials 1946-1981*. Lviv Church Cathedral. Moscow. 1992.
8. Draus J. Jan Kazimierz University in Lviv in 1939-1944. *The works of the Commission on the History of Science of the Polish Academy of Arts and Sciences*. Volume VII. 2005. P. 105-128.
9. Dzera O. *Development of property rights in Ukraine*. Kyiv: Venturi. 1996. P. 272. ISBN 5770796006.
10. Dzvankovski R. *Lexicon of the Polish clergy repressed in the USSR 1939-1988*. Lublin. 2003.
11. Glovacki A. *The Soviets towards Poles in the Eastern Territories of the Second Polish Republic 1939-1941*. Lodz. 1997. 695 p.
12. Hlebovich A. Polish Catholic clergy in Belarus and Ukraine after World War II. *Poles in the Catholic Church in the USSR, pr. tank under*. ed. E. Valevandra. Lublin. 1991. 175 p.
13. Hryciuk G. *Poles in Lviv 1939-1944. Everyday Life*. Warsaw. 2000. P. 192.
14. Kalbarchyk S. *Polish scientists, victims of Soviet crimes during World War II. Murdered, imprisoned, deported*. Warsaw. 2001. P. 218–220.
15. Krętosz J. The Roman Catholic Cathedral Committee in Lviv. *Sessions of the Executive Body and the Revision Commission of the Cathedral Committee 1965-1991*. Katowice. 2004.
16. Krukovski J. The Church and the State. *Fundamentals of Legal Relationships*. Lublin. 2000. 408 p. ISBN: 83-228-0856-9
17. Lanckoronska K. War memories, <http://www.lwow.home.pl.karolina.html>.
18. Mikhalevsky B. Attitudes towards religion and faith in the USSR on the basis of the constitutions of 1918-1977. *Volannya from Volyn. Part 2 (75)*. Ostrig. 200. P. 31-37.
19. Nowak A. Biographical dictionary of priests of the Tarnov diocese 1786-1985. *Bishops and canons. Volume I*. Tarnov. 1999.
20. Rehovich M. Frankl Stanislaw (1903-1944). *Polish Biographical Dictionary, vol. 7/1*. Krakov. 1948. P. 91.
21. Shtelnicki V. The forgotten Lviv hero of Rev. Stanislaw Frankl. Roma. 1983. ISBN: 8373000275
22. Shtelnicki V., *Archbishop in Exile Eugeniusz Baziak Metropolitan of Lviv*. Krakow. 1989, P. 100–101.
23. Shymanski J. The repressive apparatus against the Catholic Church of the Lviv metropolis of the Latin rite in the years 1939-1950 - the state of research. *Church Archives, Libraries and Museums*. 88 (2007). P. 321-338.
24. The Archdiocese of Lviv of the Latins Archidioecesis Leopolitana Latinorum in Ukraine. http://www.rkc.lviv.ua/cat_egory_3.php?cat_3=14&lang=3 03.07.2019.
25. Urban V. Archdiocese of Lviv. *Religious Life in Poland under the Occupation 1939-1945. The Vilnius and Lviv Metropolises, Religious Orders*. ed. by Z. Zhielinski, Katowice. 1992. P. 91-171.
26. Vatican Council II. *Declaration on Religious Freedom, 13*.
27. Volchanski J., Stepa Jan Piotr Paul. *Biographical Dictionary of Social Catholicism in Poland, vol. 3*. Lublin. 1995.
28. Yarema R. *Lviv church Cathedral of 1946 in the light of the triumph of Orthodoxy in Western Ukraine*. Kyiv. 2012. 320 p. ISBN 9789662279139
29. Zimny J., Lviv hero Fr Stanislaw Frankl. Sandomiezh. 2000.

Primary Paper Section: A

Secondary Paper Section: AA, AB

MODERNIZATION OF THE EDUCATIONAL CONTENT OF IT SUBJECTS: WHAT IS, IN FACT, THE LEVEL OF KNOWLEDGE AND INTEREST IN IT-ORIENTED TOPICS IN PRIMARY SCHOOL PUPILS?

*MILAN KLEMENT

*Palacký University of Olomouc, Faculty of Education, Žitkovo nám. č. 5, Olomouc, 771 40, Czech Republic
email: "milan.klement@upol.cz"*

Abstract: Modernization of the educational content in the field of Computer science, or IT subjects, in the conditions of Czech primary schools is a relatively widely discussed topic today, as the educational content as well as the teaching methods of IT subjects at primary schools often remain more or less unchanged for many years. However, a completely different situation can be observed abroad, where, for many years, prominent experts have been making proposals to change the concept of teaching so that pupils are not only educated to become active technology users, but are also encouraged to try to devise their own procedures, propose tools for solving specific problems and develop the so-called computational thinking. So, what does the specific educational content of IT subjects at the 1st and 2nd stage of Czech primary schools look like? Which IT topics are actually taught? Are there any topics in teaching that are not embedded or accentuated in the curriculum documents? We will try to answer these questions in the submitted paper, which presents some partial outputs of the conducted research focused primarily on the issue of the acceptance of educational content of IT subjects taught at primary schools.

Keywords: Information technology, IT related school subjects, Educational content, Modernization of the educational content.

1 Introduction

The need for innovation of the educational content in the field of Computer science, or IT subjects, in the conditions of Czech primary and secondary schools is a relatively widely discussed topic today. However, the curriculum of IT subjects in the Czech Republic itself is still resisting more significant changes. The educational content as well as the teaching methods of IT subjects at primary schools have remained more or less unchanged for many years. However, a completely different situation can be observed abroad, where, for many years, prominent experts have been making proposals through various summits, organizations and federations (WSIS, ACM, IFIP, UNESCO)¹ to change the concept of teaching so that pupils are not only educated to become active users of technologies and their software tools, or digital content “consumers”, but are also encouraged to try to devise their own procedures, propose tools for solving specific problems and develop the so-called computational thinking.

In connection with these efforts, the concept of computational thinking has emerged. This is a relatively new concept (Wing, 2006; Ribeiro, Nunes, Kniphoff Da Cruz & De Souza Matos, E, 2013; Ying, Yu & Pan, 2015), which reflects the need to understand the world around us from a new perspective, i.e. from the point of view of information and ways in which digital technologies work. It is a way of thinking that uses IT methods of problem solving, even for complex or vaguely defined problems. It develops the ability to analyse and synthesize, generalize, find appropriate problem solving strategies and validate them in practice. Furthermore, it leads to the precise expression of ideas and procedures and their recording in formal registrations, which serve as a general means of communication. It works with basic universal concepts that go beyond current technologies: algorithm, structures, representation of information, efficiency, modelling, information systems, principles of digital technology operation (see Strategy of digital learning up to 2020²).

All these facts imply the need for the integration of digital technologies and the development of digital competencies, in conjunction with the development of critical and creative thinking, which builds on the ability of active problem solving,

computational thinking and creativity into the educational content and learning (Štípek et al., 2015; Ala-Mutka, Punie & Redecker, 2008). The need for this integration has long been emphasized in strategic, conceptual or curricular documents and is also considered to be one of the priorities of the learning strategies in developed countries (European Commission, 2013). The development of digital competences at all levels of schools, or in the context of further education, should be directed to the target entity of this educational action, which is the corresponding level of digital literacy (Štípek et al., 2015). The contemporary concept of digital competences is based on their understanding as the abilities to use relevant knowledge and skills with responsibility, autonomy, criticism and in a creative way (Ferrari, 2013). The basic framework of digital literacy, which includes not only technical skills, but also relevant knowledge and attitudes, includes seven areas of sub-competencies (Ala-Mutka, 2011):

- information management – to identify, locate, retrieve, store and organize information,
- collaboration – to connect with others, participate in online networks and communities, communicate constructively,
- communication and sharing – to communicate through online tools, taking into account security aspects and privacy,
- content and knowledge creation – to integrate and rework previous knowledge and content, build new knowledge,
- ethics and responsibility – to behave ethically and responsibly, be aware of legal frameworks,
- evaluation and problem solving – to identify digital needs, solve problems using digital resources, evaluate acquired information,
- technical activities – to use technologies and media, perform tasks using digital tools.

Elementary schools, as part of the formal education system, have an irreplaceable role in the targeted development of digital competencies, or the relevant cognitive and operational skills and attitudes necessary for the effective use of digital technologies. The inclusion of IT subjects as a standard component of the curriculum at primary schools—is a feature of the school systems in developed countries. However, their concepts are not consistent and the differences can be seen both in the organization, or the form of the respective educational activities, and in their scope and content (Štípek et al., 2015). A significant influence on this inconsistency can be attributed not only to different didactic approaches and levels of equipment, but also to the level of digital competencies of pupils themselves. There is also a non-negligible influence of a certain “inflexibility” of the teachers of these subjects, who very often emphasize the training of specific software tools for searching and processing of text information control, rather than the targeted development of pupils’ computational thinking (Rambousek, Štípek & Wildová, 2015).

There was no easy way to the outlined concept of development of pupils’ digital competencies—at least in terms of Czech education. Over time, the concept, content and focus of educational units focused on the development of pupils’ competencies in the field of IT have been changing because of both the social demand and the development of their own technologies.

2 Analysis of the educational content of Computer science

The practical realization of the teaching of Computer science, or IT-oriented subjects, is anchored in the curriculum documents of the individual educational establishments, which are created in accordance with the 2005 school reform. This reform introduced a system of educational programs and two-stage curriculum development, which covers primary and secondary education (MŠMT [MEYS], 2017). As already stated, this system consists

¹ WSIS – World Summit on the Information Society (<http://www.itu.int/wsis/index.html>), ACM – Association for Computing Machinery (<https://www.acm.org/>), IFIP – International Federation for Information Processing (<http://www.ifip.org>)

² See http://www.vzdelavani2020.cz/images_obsah/dokumenty/strategie/digistrategie.pdf

mainly of the Framework Educational Programs (FEP) and the School Educational Programs (SEP), where the Ministry of Education, Youth and Sports of the Czech Republic (MŠMT ČR [MEYS]) issues binding Framework Educational Programs for the individual fields of education, according to which individual schools create their own School Educational Programs. The aim of this measure was to enable the graduates to be more flexible in terms of the conditions of the particular school, the needs of the regional labour market, the development of the field, the skills and interests of the pupils, and to ensure that all pupils receive comparable education corresponding to the needs of the modern labour market and the civic life (Walterová, 2004). Thus the curricular reform has given schools not only the opportunity to develop their own educational programs and take the role of an educator, but also to participate in the design of education (Tupý, 2014). The School Educational Programs are created by schools according to the FEP for the area of education they want to implement. The Framework Program is elaborated in their SEPs with respect to the pupil, the educational conditions in the given school, the needs of the regional labour market and the aims of the school's development. The SEPs are not institutionally approved, it is the director of the school who is responsible for their processing. The SEPs must be displayed at a publicly accessible place at the school.

Schools have thus been given the opportunity to adapt the content of education to the specific needs of their pupils, the specifics of their regions, as well as the specifics of the schools themselves. Within the FEP, nine educational areas, including the Information and Communication Technologies (ICT), have been defined. Within the creation of SEPs of individual schools, there was room for teaching IT topics that need not be firmly embedded within the FEP for Information and Communication Technologies, as the whole system allows relative freedom of choice of content or form of fulfilment of pupils' key competencies. This relative freedom is also given by the vague definition of the characteristics and content of the educational area of Information and Education Technologies, which specifies the expected outputs focused on what the pupil can do at the end of a given period, rather than defines a particular curriculum.

Therefore, if we want to find out what is actually being learnt at Czech primary schools within the ICT field, it is necessary to analyse in detail the SEPs of individual schools in this area. Even before the analysis, it could be presumed that individual IT topics will be probably divided into "traditional" themes (i.e. those that are firmly embedded in the FEP for the area of Information and Communication Technologies) and "non-traditional" themes (i.e. those that are expected to be embedded during the implementation of the Strategy of digital learning up to 2020).

The further presented analysis of SEP for the educational area of Information and Communication Technologies was carried out on a total of 17 primary schools located in three regions of the Czech Republic (Olomouc, Moravian-Silesian and Zlín regions). The structure of the schools was chosen to guarantee the highest informative value of the results obtained. There were small schools for 200 pupils, medium-sized schools for 200 to 500 pupils, as well as large schools for more than 500 pupils. Consideration was also given to the proportional representation of rural and urban schools, although we did not think that the equipment of rural schools could show a higher level of imperfection and incompleteness than the equipment of urban schools. However, it is necessary to admit that the availability of adequate equipment for the provision of Information and Communication Technology teaching is one of the conditions for its meaningful implementation in school education, as the ownership of these tools does not necessarily mean that they are actually used (Klement, Dostál & Bártek, 2017). Another condition for the inclusion of a given school in the analysis of its SEP in the educational field of Information and Communication Technologies was whether the school has implemented the education for both the 1st and the 2nd level of education, otherwise the results would be incomparable. Therefore, in order to be able to describe the real content of IT subjects taught at

elementary schools in the educational field of Information and Communication Technologies, we carried out an analysis of the SEPs of the seventeen schools surveyed. The analysis was performed using the method of controlled structured observation of the frequency of occurrence of specific thematic units, fully with their declared content at the SEP level. The result of this analysis is presented in Figure 1.

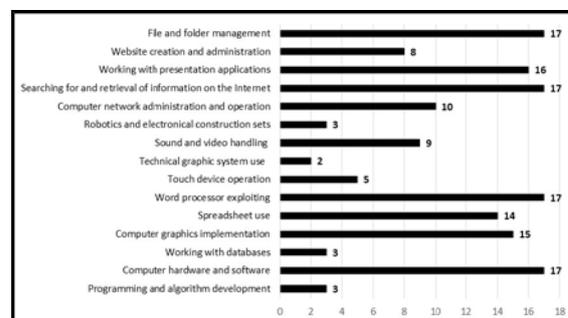


Figure 1 Frequency of occurrence of thematic units

From the above summary, it is evident that the thematic units "File and folder management", "Searching for and retrieval of information on the Internet", "Word processor exploiting" and "Computer hardware and software" have the highest level of representation in primary school education. These thematic units were included in all seventeen SEPs of the schools surveyed. These top-level thematic units can be supplemented with the thematic units "Working with presentation applications", "Spreadsheet use" and "Computer Graphics implementation", which were included in the vast majority of the schools' SEPs. This result is logical as these thematic units are firmly embedded within the framework of the FEP for the Information and Communication Technologies educational area.

Among other relatively broadly represented themes are: "Website creation and administration", "Computer network administration and operation" and "Sound and video handling". These thematic units were represented in the SEPs of more than 50% of the schools surveyed, which is probably the result of their optionality. Although they are not explicitly embedded in the FEP for the Information and Communication Technologies education area, some of the "traditional" thematic units affect them or provide the necessary basis for them. Also the popularity of the topics covered within these thematic units may play its part here, since the creation of videos and web presentations (e.g. the phenomenon of the so-called YouTubers) is a sought-after and appreciated skill amongst pupils today and teachers seem to reflect it in their teaching as well.

Surprisingly, the "non-traditional" thematic units "Robotics and electronical construction sets", "Technical Figureic system use", "Touch device operation", "Working with databases" and, above all, "Programming and algorithm development" are not rarely represented and have higher frequencies of occurrence than would be expected. These thematic units are not mentioned in the FEP for the area of Information and Communication Technologies and their occurrence at schools is exclusively related to the will of the teachers or the school management. These are also some of the thematic units that should be developed in line with the implementation of the Strategy of digital learning up to 2020, but it is evident that teachers already feel the need for their inclusion in teaching, which is a very positive finding.

The occurrence of the thematic unit itself, although it is surprising, does not yet mean its popularity with pupils or its necessity and usefulness from teachers' point of view. There may also be differentiated differences in the level of pupils' knowledge and skills in individual units, which may also be caused by a different approach to educational content and the issue itself. In order to understand and describe these dependencies and internal relations, it was necessary to carry out a research survey focused on the issue of the acceptance of the

teaching contents of IT subjects taught at primary schools in the Czech Republic, whose methodology, objectives and results are given in the following section.

3 The focus and methodology of the research conducted

In the previous section were described some of the developmental trends related to the development of content and forms of IT subjects teaching within the educational system of the Czech Republic as well as abroad. We also attempted to indicate some pitfalls or challenges that determine this development. However, it is not possible to determine the extent to which these trends, pitfalls or challenges are significant without examining this issue using pedagogical research methods. This examination, aimed at finding the current state of acceptance of the teaching contents of IT subjects taught at primary schools in the Czech Republic, was carried out on the basis of a research survey that took place at 35 kindergartens, primary and secondary schools during the year 2017.

This effort was based on some selected research surveys, which mapped the real situation of the teaching of IT subjects at Czech schools. From the domestic studies, we can mention, for example, the research titled *IT Competence of Children and Their Development at Primary Schools*, carried out within the project of the Grant Agency of the Czech Republic (GAČR) in 2012-2013 under the direction of V. Rambousek, which explored the attitudes of teachers and pupils towards individual themes of ICT teaching and attempted to map the state and concept of teachers' and pupils' IT competence development (Rambousek, 2013). This issue is also researched and dealt with abroad. For example, in 2012, The Royal Society published a report titled *Shutdown or restart?: The way forward for computing in UK schools*, which can be considered as one of the basic documents for defining a new English curriculum of IT subjects. Based on this document, UK specialists have decided to carry out their own project *Computing in Schools* (running from August 2010 to 2012 at selected schools in England), whose aim was to provide a sufficiently conclusive and impartial view of the current situation of the ICT curriculum in England and draw suggestions for possible changes (The Royal Society, 2012). Also in America, the issue of teaching IT topics at primary schools has been the focus of attention for several years. In particular, the Computer Science Teachers Association (CSTA) and its parent Association for Computing Machinery (ACM) have recently been actively involved in the preparation of standards for the teaching of IT subjects (or more precisely of the Computing Science) for K-12 pupils, i.e. for pupils from the first to the twelfth year of primary schools (CSTA, 2011).

The further presented research was primarily focused on *the issue of acceptance of the teaching content of IT subjects taught at primary schools in the Czech Republic* and the target group was formed by pupils of the 9th year of primary school. A part of the research was also the area of acceptance of possible changes in the educational content towards the substantial extension of the teaching of algorithmization and programming, as envisaged in the Strategy of Digital Learning up to 2020. Subsequently, the issue of digital competences and their development in the context of the contemporary concept of digital literacy with an overlap to the possibility of modernization of the educational content accepting the need for the development of pupils' digital thinking has become a subject of research activity. The subject of the research was broken down into two relatively separate research areas:

- The aim of the first research area was to find a subjective level of knowledge in IT-related topics, or teaching units, in which pupils' relevant digital competencies are being developed at primary schools.
- The aim of the other research area was to find a subjective interest in individual topics, or teaching units, that are taught in IT subjects at primary schools.

An important factor for evaluating the overall situation in the area of acceptance of the teaching content of IT subjects taught

at primary schools in the Czech Republic is also the independence of the obtained results from some significant features of the respondent groups, such as their gender. Although the use of gender in the research is sometimes rightly criticized, we believe that there are some substantial reasons why this comparison should be used in this specific case. This important feature of the group of 9th year pupils could not be overlooked, as the explanation of a state that is completely dependent on gender could not be described as fully valid. For these reasons, the intention was to subject the obtained results to analyses that would verify relative independence from some important characteristics of the research sample. Thus, the following research hypotheses were formulated:

- The pupils of the 9th year of primary school – boys declare a higher level of knowledge in the IT thematic units than the pupils of the 9th year of primary school – girls.
- The pupils of the 9th year of primary school – boys declare a higher interest in the learning of thematic units that go beyond the FEP for Information and Communication Technologies than the pupils of the 9th year of primary school – girls.

A questionnaire was used as the basic means of obtaining the data needed to conduct a research survey. In the classification structure of research methods, the questionnaire is an indirect – investigative method. The questionnaire can be characterized as “a specific means by which people's opinion on individual phenomena is examined” (Chráska & Kočvarová, 2015). From the point of view of an individual (respondent), the examined phenomena can relate either to external phenomena or to internal processes. For the purposes of the research, a structured questionnaire based on the research questions and hypotheses described above (Pfitzner, Leibbrandt & Powers, 2009) was created to help determine the opinions of pupils of the 9th year of primary school about the phenomena under investigation. The questionnaire contained both closed questions with the answer offered, semi-closed questions with a range of answers (using the four-step scale), but also open questions, in which the respondents could record the varied status of the observed phenomena. To ensure the clarity of the individual questions, the questionnaire was supplemented by an explanatory text defining the terms used. The research questionnaire contained 9 questionnaire items focused on the phenomena under investigation, as well as an information apparatus that was used for the identification of some significant features of the respondents, such as the gender and age of the pupils, or the location of the school they attended. The research questionnaire was distributed, in the period from April to June 2019, among the pupils of the 9th year of a total of 35 primary schools. Altogether, the questionnaire was filled in by 342 respondents pupils of the 9th year of primary school. A detailed description of the research sample is given in Table 1.

Table 1 Structure of the research sample

Characteristic	Group	Frequency	Frequency in %
Gender	boys	144	42.1%
	girls	198	57.9%
Age	14 years	130	38.0%
	15 years	212	62.0%
Location	in the city	195	57.0%
	in the village	147	43.0%

For the determination of the power of the individual groups of respondents answering in the same way, basic descriptive statistics and their visualization with Figures were used. Furthermore, these results were subjected to an analysis, which monitored the importance of responses for individual groups of respondents broken down by significant features (such as gender). For this verification, we used the parametric Student's t-test for independent groups, which compares the averages of one variable in two groups (Chráska & Kočvarová, 2015).

The following text presents some partial outcomes of the conducted research, which was primarily focused on the issue of acceptance of the educational content of IT subjects taught at

primary schools in the Czech Republic, and whose target group was formed by pupils of the 9th year. A part of the research was also the area of acceptance of possible changes in the educational content towards the substantial extension of the teaching of algorithmization and programming.

4 The current level of knowledge in IT topics

The aim of the first research area was to find a subjective level of knowledge in IT-related topics, or teaching units, in which pupils' relevant digital competencies are being developed at primary schools. The word "subjective" is used deliberately, as the level of knowledge was assessed by the pupils themselves, which may lead to a distortion of the actual level of knowledge, since it is possible for pupils to intentionally or unintentionally reduce or increase the declared level of their knowledge. However, it should be pointed out that it was not our intention to find the current or actual level of knowledge, for which we would have to confront the declared level with the teachers' evaluation or the pupils' marks. On the contrary, we wanted to find out in which thematic units the pupils feel more proficient, and in which topics they are less competent.

Furthermore, we assumed that pupils would probably declare a higher level of knowledge in "traditional" themes, which are firmly embedded in the FEP for the area of Information and Communication Technologies. We also assumed that a lower level of knowledge would be declared in "non-traditional" themes, which are expected to be embedded during the implementation of the Strategy of digital learning up to 2020). A summary of the answers of pupils of the 9th year is given in Table 2, on the basis of which it was also possible to proceed with the verification of the established research assumption.

Table 2 Declared level of knowledge

IT thematic units	Declared level of knowledge				
	Very high	High	Low	None	No answer
Programming and algorithm development	0.0%	24.6%	45.9%	29.5%	0.0%
Computer hardware and software	0.0%	42.1%	39.8%	12.0%	6.1%
Working with databases	0.0%	23.1%	41.8%	29.5%	5.6%
Computer graphics implementation	0.0%	56.1%	27.5%	4.4%	12.0%
Spreadsheet use	5.8%	20.8%	56.7%	0.0%	16.7%
Word processor exploiting	0.0%	43.9%	5.3%	2.6%	48.2%
Touch device operation	0.0%	28.4%	2.6%	1.2%	67.8%
Technical graphic system use	0.0%	11.4%	48.2%	38.0%	2.3%
Sound and video handling	0.0%	27.2%	44.7%	18.1%	9.9%
Robotics and electronical construction sets	0.0%	5.3%	27.5%	66.4%	0.9%
Computer network administration and operation	0.0%	22.2%	49.4%	21.3%	7.0%
Searching for and retrieval of information on the Internet	0.0%	47.4%	3.2%	2.0%	47.4%
Working with presentation applications	0.0%	43.3%	6.7%	1.8%	48.2%
Website creation and administration	0.0%	20.8%	41.5%	33.6%	4.1%
File and folder management	0.0%	36.0%	8.5%	2.9%	52.6%

To maximize the value of the acquired data, the verbal evaluation was converted to nominal data (Maul, Irribarra & Wilson, 2016) with the following structure: answer Very high - value 4, answer High - value 3, answer Low - value 2 and answer None - value 1 (value 0 was assigned to No answer items, thanks to which we retained the original five-grade scale). This adjustment enabled us to calculate the arithmetic mean of the assessment of the declared pupils' knowledge in individual thematic units and compile a Figure of averages expressing a more accurate and more transparent mutual comparison. The whole situation is clear from Figure 2 given above.



Figure 2 Declared level of knowledge - averages

From Figure 2 given above, it is clear that the highest average level of declared pupils' knowledge was reached in the thematic units: "Computer graphics implementation", "Word processor exploiting", "Searching for and retrieval of information on the Internet", "Working with presentation applications" and "File and folder management". These are typical "traditional" thematic units that are included in the area of Information and Education Technologies, and their teaching is logically the most accented one. This, apparently, is not such a surprising result, as the fulfilment of the FEP topics, which are then reflected within the SEPs of individual schools, is thoroughly controlled within the control visits of the Czech School Inspectorate, and teachers are, therefore, forced to teach these subjects consistently. However, interesting is also the fact that "non-traditional" thematic units such as: "Programming and algorithm development", "Working with databases", "Technical graphic system use", "Robotics and electronical construction sets" and "Website creation and administration" have reached relatively high values, too. This is explained by the fact that teachers introduce these topics into teaching within the optional content of the FEP, which is pleasing, but partly also by the fact that the pupils themselves are interested in these topics and study them independently within their out-of-school activities.

The obtained results were then subjected to further analyses, focusing on the fact whether they are not dependent on individual significant features of the respondent groups. On the basis of this, the following hypothesis (H1) was created, together with its null hypothesis ($H_{0,1}$) and alternative hypothesis ($H_{A,1}$).

H1: The pupils of the 9th year of primary school – boys declare a higher level of knowledge in the IT thematic units than the pupils of the 9th year of primary school – girls.

$H_{0,1}$: There are no differences between the level of knowledge in the IT thematic units declared by the pupils of the 9th year of primary school – boys and girls.

$H_{A,1}$: The pupils of the 9th year of primary school – girls declare a higher level of knowledge in the IT thematic units than the pupils of the 9th year of primary school – boys.

The established hypothesis was verified on a sample of 342 respondents, pupils of the 9th year of primary school, using the Student's t-test for independent groups, with the grouping variable being the gender of the respondents, as shown in Table 3.

Table 3 Declared level of knowledge versus gender

IT thematic units	Student's t-test; grouped by gender, number of respondents: 342 What is your current knowledge of, and what skills do you currently have in each of the IT topics?				
	Group 1 (girls)	Group 2 (boys)	p	Valid responses of Group 1	Valid responses of Group 2
Programming and algorithm development	1.878788	2.048611	0.034662	198	144
Computer hardware and software	2.207071	2.722222	0.000001	198	144
Working with databases	1.944444	2.187500	0.010114	198	144
Computer Figures implementation	2.808081	2.687500	0.124346	198	144
Spreadsheet use	2.843434	2.840278	0.970006	198	144
Word processor exploiting	3.424242	3.312500	0.149136	198	144
Touch device operation	3.654822	3.590278	0.325846	197	144
Technical Figureic system use	1.717172	1.822695	0.176850	198	141
Sound and video handling	2.191919	2.423611	0.015652	198	144
Robotics and electronical construction sets	1.297980	1.555556	0.000179	198	144
Computer network administration and operation	2.085859	2.236111	0.100200	198	144
Searching for and retrieval of information on the Internet	3.439394	3.333333	0.141988	198	141
Working with presentation applications	3.464646	3.263889	0.007752	198	144
Website creation and administration	1.914141	2.006944	0.314445	198	144
File and folder management	3.419192	3.333333	0.305268	198	144

Since $p > 0.05$ is achieved only in six out of the fifteen thematic units (Programming and algorithm development $p = 0.034662$; Computer hardware and software $p = 0.000001$; Working with databases $p = 0.010114$; Sound and video handling $p = 0.015652$; Robotics and electronical construction sets $p = 0.000179$; Working with presentation applications $p = 0.007752$), we cannot reject the null hypothesis and it is therefore possible to state, with certain reservations, that there are no differences between the level of knowledge in the IT thematic units declared by the pupils of the 9th year of primary school – boys and girls, and the obtained results are not gender-dependent.

Again, we can point to one interesting fact, namely, that there are five “non-traditional” themes among the six partially dependent thematic units that are not covered in the FEP for the area of Information and Communication Technologies. The only “traditional” topic included among these items is “Working with presentation applications”, where the girls declare a statistically significantly higher level of knowledge than the boys. For the other “non-traditional” thematic units where there is a statistically significant difference, a higher level of knowledge is declared by the boys.

For simplicity, the whole situation was again visualized in the form of a Figure depicting the arithmetic means of the assessment of the declared level of pupils' knowledge in individual thematic units, with one curve representing the girls' assessment and the other one representing the boys' assessment. The whole situation is clear from Figure 3 given below.

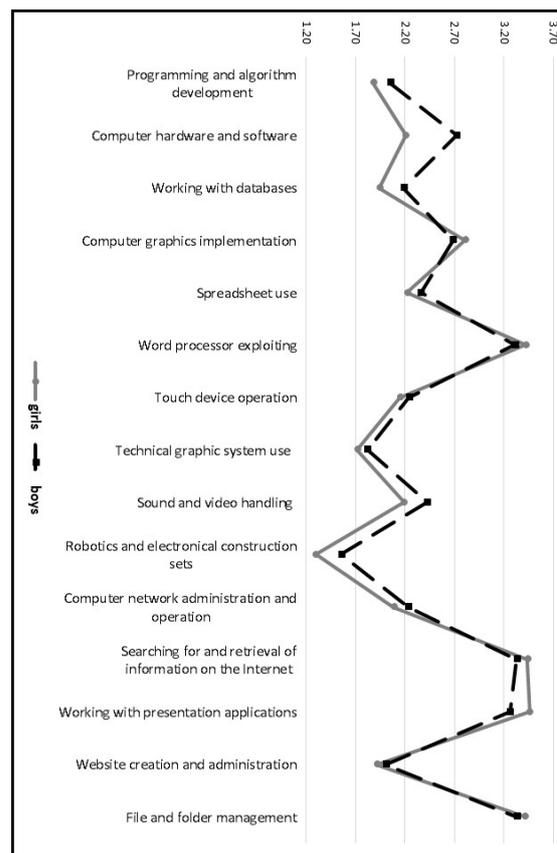


Figure 3 Declared rate of interest – averages by gender

On the basis of the performed analyses, it can be stated that the research assumption we have established was verified and refined: *The pupils of the 9th year of primary school declare that they reach the highest level of knowledge in the thematic units corresponding to the current focus of the FEP for the area of Information and Communication Technologies. The highest level of knowledge has been declared in the thematic units: “Computer Figures implementation”, “Word processor exploiting”, “Searching for and retrieval of information on the Internet”, “Working with presentation applications” and “File and folder management” and these results are essentially gender-independent.*

5 The rate of interest in individual IT topics

The aim of the other research area was to find the pupils' subjective interest in individual topics, or teaching units, that are taught in IT subjects at primary schools. The word “subjective” is, again, used deliberately, as the rate of interest in individual topics was declared by the pupils themselves, but the summary of their answers makes it possible to objectify this interest and identify the majority preferences of individual groups of pupils in the 9th year of primary school. The aim was to find out the actual interest rate of pupils in particular educational units focused on both “traditional” and “non-traditional” IT topics, including the comparison of this interest with the current level of knowledge presented in the previous subchapter.

Thanks to their rapid development, digital technologies are becoming more and more accessible to users, including primary school pupils. Projects, programs and multimedia records which are especially popular with pupils today, and which could have been previously created only with the use of specialized professional programs and equipment, can nowadays be created and edited using many native applications that are often part of operating systems. Their operation is also not complicated and the desired outcome can be reached in a relatively short period of time, with reasonable effort. This boom has enabled pupils to create these projects without the need for prior targeted

institutionalized training, when they are able to penetrate independently into the principles of functioning and operation of these systems and applications. It could be expected that pupils, apart from the “traditional” IT topics, might be interested also in the “non-traditional” ones, either because of their relative novelty (from their subjective point of view), or because of the above mentioned need to increasingly penetrate into the secrets of modern digital technologies. Based on this consideration, the following research assumption was established: *The pupils of the 9th year of primary school declare that they are interested in the education of thematic units that go beyond the framework of the FEP for the area of Information and Communication Technologies.*

A summary of the answers of pupils of the 9th year is given in Table 4, on the basis of which it was also possible to proceed with the verification of the established research assumption.

Table 4: Declared rate of interest in IT topics

IT thematic units	Declared level of knowledge				
	Very high	High	Low	None	No answer
Programming and algorithm development	16.7%	29.8%	40.9%	11.7%	0.9%
Computer hardware and software	14.0%	27.5%	52.3%	5.3%	0.9%
Working with databases	6.4%	21.1%	52.3%	18.4%	1.8%
Computer Figures implementation	34.2%	37.4%	24.3%	3.2%	0.9%
Spreadsheet use	9.1%	38.3%	47.1%	4.7%	0.9%
Word processor exploiting	25.7%	45.0%	26.9%	1.5%	0.9%
Touch device operation	55.0%	30.4%	11.4%	1.5%	1.8%
Technical Figureic system use	27.2%	31.6%	34.2%	5.3%	1.8%
Sound and video handling	31.9%	40.1%	26.0%	2.0%	0.0%
Robotics and electronical construction sets	16.4%	21.3%	38.0%	23.4%	0.9%
Computer network administration and operation	7.6%	32.5%	48.2%	10.8%	0.9%
Searching for and retrieval of information on the Internet	19.6%	48.5%	30.1%	0.9%	0.9%
Working with presentation applications	27.5%	38.0%	31.6%	2.9%	0.0%
Website creation and administration	25.4%	35.7%	28.7%	9.4%	0.9%
File and folder management	18.4%	29.8%	45.6%	4.4%	1.8%

To ensure greater simplicity and visual clarity, the acquired data were also converted into Figure 4, which is given below.

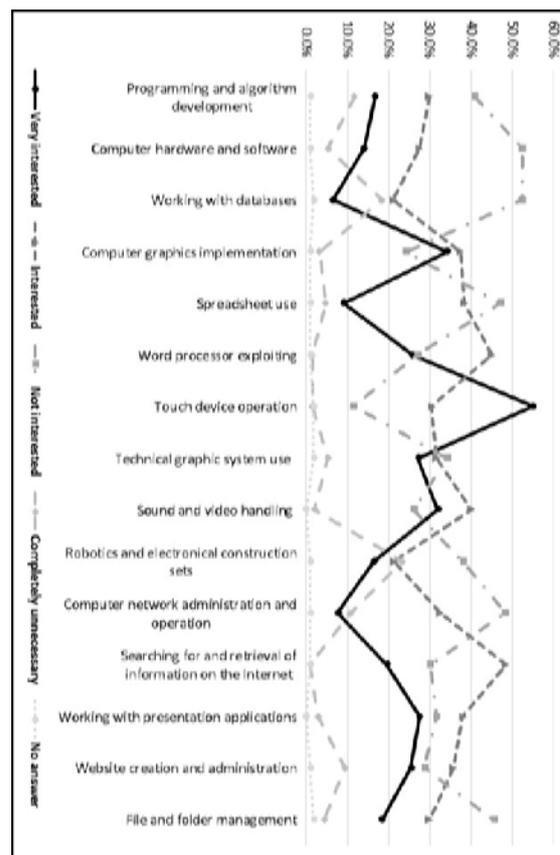


Figure 4 Declared rate of interest in IT topics - visualization

As can be seen from Table 4 and Figure 4, the highest cumulative rate of declared interest (answers: Very interested and Interested) has been reached in the thematic unit of “Touch device operation” with the value of 85.4%. Other thematic units³ could be sorted according to the same criteria as follows: “Sound and video handling” – 72.0%, “Computer Figures implementation” – 71.6%, “Word processor exploiting” – 70.7% and “Searching for and retrieval of information on the Internet” – 68.1%.

With regard to the results presented above, it is very interesting to note that the thematic unit of “Touch device operation” was from the point of view of the pupils who declared a very high level of interest in this topic rated the best (answer Very interested) at 55.0%. For the sake of completeness, it should be noted that this thematic unit, when evaluating the subjective level of pupils’ knowledge, has reached the highest level of ambivalent assessment (No Answer) of 67.8%. This phenomenon can be explained mainly by the fact that pupils may be able to use these devices, but, within the framework of institutionalized teaching, they normally do not encounter this thematic unit, which can be considered as the cause of the above mentioned ambivalence. This explanation is also confirmed by the result given above when this thematic unit clearly showed the highest level of interest among the pupils of the 9th year of primary school. From the opposite point of view, the lowest cumulative rate of declared interest (answers: Not interested and Completely unnecessary) has been reached in the thematic unit of “Working with databases” with the value of 70.7%. Other thematic units, now in the opposite order, could be sorted according to the same criteria as follows: “Robotics and electronical construction sets” – 61.4%, “Computer network administration and operation” – 59.0%, “Computer hardware and software” – 57.6% and “Programming and algorithm development” – 52.6%. Here again, we can draw attention to one interesting fact regarding the evaluation of individual thematic

³ Presented here is the top five topics with the highest declared rate of interest, together with the last five thematic units with the lowest declared rate of interest.

units from the indecision of interest point of view (No answer). The variance of this response reached the highest value of 1.8% for a total of four thematic units, 0.9% for a total of nine thematic units and 0.0% only for two thematic units. This result points to the fact that pupils are better able to express their interest in individual thematic units rather than subjectively assess the level of their knowledge, when we would rather expect a significant overestimation of this level.

To maximize the value of the acquired data, the verbal evaluation was, again, converted to nominal data (Maul, Irribarra & Wilson, 2016) with the following structure: answer Very interested - value 4, answer Interested - value 3, answer Not interested - value 2 and answer Completely unnecessary - value 1 (value 0 was assigned to No answer items, thanks to which we retained the original five-grade scale). This adjustment enabled us to calculate the arithmetic mean of the assessment of the pupils' declared rate of interest in individual thematic units and compile a Figure of averages expressing a more accurate and more transparent mutual comparison. The whole situation is clear from Figure 5 given below.

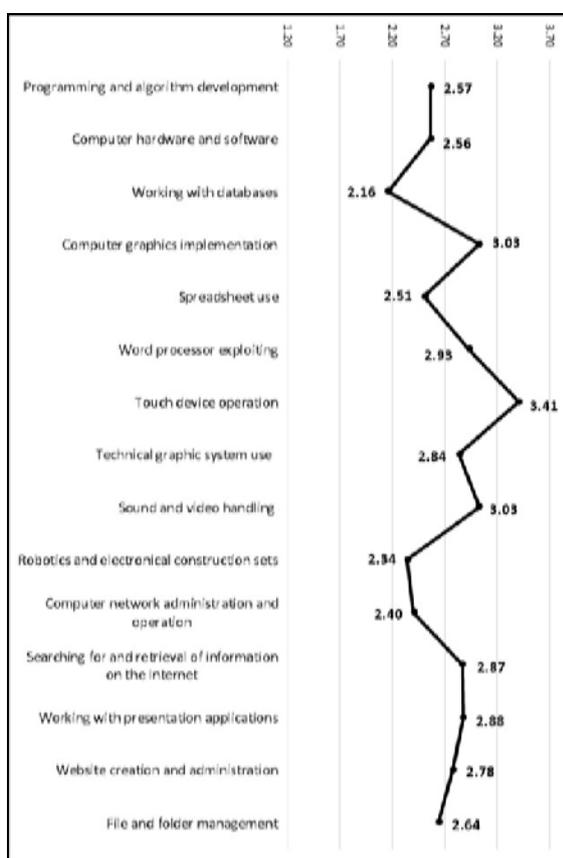


Figure 5 Declared rate of interest in IT topics - averages

From Figure 5 given above, it is clear that the highest average rate of declared pupils' interest was reached in the thematic units: "Touch device operation", "Computer Figureic implementation", "Sound and video handling", "Working with presentation applications" and "Searching for and retrieval of information on the Internet". These are not always typical "traditional" thematic units that are included in the FEP for the area of Information and Communication Technologies, but there are also topics that are not part of it. This, again, confirms the pupils' interest in other "non-traditional" thematic units, such as: "Programming and algorithm development", "Technical Figureic system use" and "Website creation and administration", which have reached relatively high values, too. The whole situation is clear from Figure 6 given below, which visualizes the comparison between the declared subjective level of pupils' knowledge and the declared pupils' interest in individual thematic units.

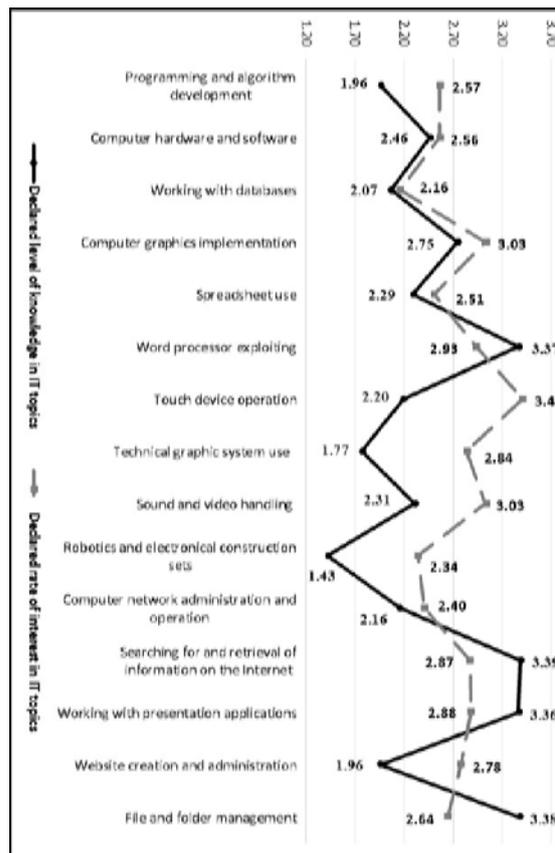


Figure 6 Declared rate of interest versus Declared level of knowledge

If we compare the individual sub-values presented in Figure 6, the greatest difference between the declared interest and the declared level of knowledge of the pupils, in favour of the expressed interest, can be seen in the thematic units of "Programming and algorithm development", "Touch device operation", "Technical Figureic system use", "Sound and video handling", "Robotics and electrical construction sets" and "Website creation and administration". These thematic units although the pupils declared a relatively low level of knowledge in them are interesting from their point of view, and they would like to be educated in them. It is also necessary to add that these are, in large part, "non-traditional" topics which are not part of the FEP for the area of Information and Communication Technologies. If we look at the issue from the opposite point of view, i.e. from the point of view of the declared level of knowledge and the declared interest, we will find out that the greatest difference can be noted in the thematic units of "Word processor exploiting", "Searching for and retrieval of information on the Internet", "Working with presentation applications" and "File and folder management", which are typical "traditional" thematic units firmly embedded in the FEP for the area of Information and Education Technologies. Although the pupils declare a relatively high level of knowledge in these areas, they are not as much interested in these topics, as they are in "non-traditional" themes.

The obtained results were then, again, subjected to further analyses, focusing on the fact whether they are not dependent on individual significant features of the respondent groups. On the basis of this, the following hypothesis (H2) was created, together with its null hypothesis ($H_{0,2}$) and alternative hypothesis ($H_{A,2}$).

H2: The pupils of the 9th year of primary school – boys declare a higher rate of interest in the education of thematic units that go beyond the framework of the FEP for the area of Information and Communication Technologies than the pupils of the 9th year of primary school – girls.

$H_{0,2}$: There are no differences between the rate of interest in the education of thematic units that go beyond the framework of the FEP for the area of Information and Communication Technologies declared by the pupils of the 9th year of primary school – boys and girls.

$H_{A,2}$: The pupils of the 9th year of primary school – girls declare a higher rate of interest in the education of thematic units that go beyond the framework of the FEP for the area of Information and Communication Technologies than the pupils of the 9th year of primary school – boys.

The established hypothesis was verified on a sample of 342 respondents, pupils of the 9th year of primary school, using the Student's t-test for independent groups, with the grouping variable being the gender of the respondents, as shown in Table 5.

Table 5 Declared rate of interest versus gender

IT thematic units	Student's t-test; grouped by gender, number of respondents: 342 Which IT topics, including those you have not come across yet, would you be most interested in?				
	Group 1 (girls)	Group 2 (boys)	p	Valid responses of Group 1	Valid responses of Group 2
Programming and algorithm development	2.256410	2.875000	0.000001	195	144
Computer hardware and software	2.189744	2.937500	0.000045	195	144
Working with databases	2.143590	2.177305	0.703790	195	141
Computer graphics implementation	3.071795	2.986111	0.359059	195	144
Spreadsheet use	2.605128	2.409722	0.114201	195	144
Word processor exploiting	3.102564	2.763889	0.000051	195	144
Touch device operation	3.463542	3.347222	0.160960	192	144
Technical graphic system use	2.743590	2.929078	0.062144	195	141
Sound and video handling	2.949495	3.111111	0.069764	198	144
Robotics and electronical construction sets	2.128205	2.555556	0.000101	195	144
Computer network administration and operation	2.194872	2.611111	0.000001	195	144
Searching for and retrieval of information on the Internet	2.923077	2.812500	0.164404	195	144
Working with presentation applications	3.020202	2.736111	0.001832	198	144
Website creation and administration	2.774359	2.784722	0.919951	195	144
File and folder management	2.583333	2.701389	0.200507	192	144

Since $p > 0.05$ is, again, achieved only in six out of the fifteen thematic units (Programming and algorithm development $p = 0.000001$; Computer hardware and software $p = 0.000045$; Word processor exploiting $p = 0.000051$; Robotics and electronical construction sets $p = 0.000101$; Computer network administration and operation $p = 0.000001$; Working with presentation applications $p = 0.001832$), we cannot reject the null hypothesis and it is therefore possible to state, with certain reservations, that *there are no differences between the rate of interest in the education of thematic units that go beyond the framework of the FEP for the area of Information and Communication Technologies declared by the pupils of the 9th year of primary school – boys and girls.*

For simplicity, the whole situation was again visualized in the form of a Figure depicting the arithmetic means of the assessment of the declared level of pupils' knowledge in individual thematic units, with one curve representing the girls' assessment and the other one representing the boys' assessment. The whole situation is clear from Figure 7 given below.

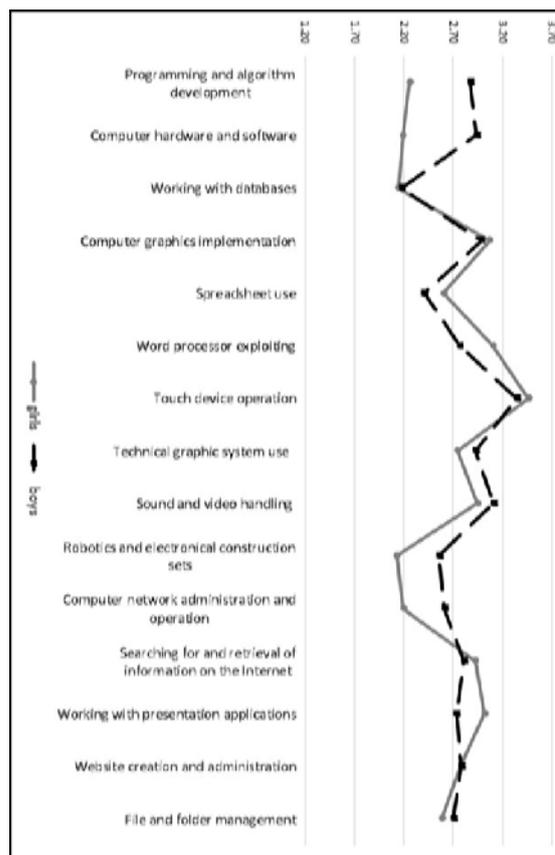


Figure 7 Declared rate of interest – averages by gender

According to the visualization shown in Figure 7, it is possible to point to one interesting fact, namely, that there are three “non-traditional” themes among the six partially dependent thematic units that are not covered in the FEP and three “traditional” ones. In the “non-traditional” thematic units of “Programming and algorithm development”, “Robotics and electronical construction sets” and “Computer network administration and operation”, the boys show a statistically significantly higher rate of interest than the girls. If we add to this one of the “traditional” themes: “Computer hardware and software”, where the boys declare statically significantly higher rate of interest than the girls, we can say that this analysis confirmed the generally lower rate of interest of girls in purely technical or technological themes. On the other hand, in the area of “traditional” themes, i.e. in the thematic units of “Word processor exploiting” and “Working with presentation applications”, the girls show a statistically significantly higher rate of interest than the boys, which only confirms the above assumption.

On the basis of the performed analyses, it can be stated that the research assumption we have established was verified and refined: *The pupils of the 9th year of primary school declare that they are interested in the education of thematic units that go beyond the framework of the FEP for the area of Information and Communication Technologies. The highest rate of interest has been declared in the thematic units: “Touch device operation”, “Computer graphics implementation”, “Sound and video handling”, “Working with presentation applications” and “Searching for and retrieval of information on the Internet” and these results are essentially gender-independent.*

6 Conclusion

As stated in the introduction of this paper, the basic goal of the conducted research was to *identify and describe the current state, structure, level, concept and interest in the further development of digital competences from the point of view of pupils of the 9th year of primary school using relevant research methods.* In fulfilling this objective, it was necessary to make a

full explanation of pupils' opinions about individual thematic units taught within IT courses, with an overlap to finding out their preferences and interests in teaching the thematic unit of programming and algorithm development. It was, therefore, necessary to implement several steps to achieve the partial objectives for the individual parts of the conducted research. On the basis of these results, it can be stated that the established research assumptions and hypotheses have been largely confirmed and it is therefore possible to state the following: *the pupils of the 9th year of primary school declare that they reach the highest level of knowledge in the thematic units corresponding to the current focus of the FEP for the area of Information and Communication Technologies, but they are also interested in the education of thematic units that go beyond the framework of the FEP for the given area.*

The pupils understand the need for and benefits of teaching IT topics, even beyond the framework of the FEP for the area of Information and Communication Technologies. Most pupils also understand the need for teaching a thematic unit focused on programming and algorithm development, and only a minority of them does not perceive this need. The reasons leading pupils to the refusal of inclusion of algorithmization and programming in the school curriculum may vary from pure ignorance, through internal barriers, to negative experience, but it is, of course, possible to speculate about other reasons and limitations, too. It is, therefore, the task of further scientific and field work to analyse these obstacles and find ways to overcome them, so that even this part of the pupils understands the added value of this thematic unit. Furthermore, it is necessary to make further efforts in the field of research, project and field work, and try to create a concept of teaching this thematic unit not only at the appropriate depth, but also with an overlap to the practical application from the viewpoint of pupils.

7 Discussion and interpretation of the result

The obtained result is not so surprising, as the fulfilment of the FEP topics, which are then reflected in the SEPs of individual schools, is thoroughly controlled within the control visits of the Czech School Inspectorate, and teachers are, therefore, forced to teach these subjects consistently. This is also probably the reason why pupils declare a higher level of knowledge in these "traditional" thematic units than in the other ones. Here again, we must point out that the level of knowledge was assessed subjectively by the pupils themselves, which may have led to a distortion of the actual level of knowledge, since it is possible for pupils to intentionally or unintentionally reduce or increase the declared level of their knowledge.

However, interesting is also the fact that "non-traditional" thematic units such as: "Programming and algorithm development", "Working with databases", "Technical Figureic system use", "Robotics and electronical construction sets" and "Website creation and administration" have reached relatively high values, too. This is explained by the fact that teachers introduce these topics into teaching within the optional content of the FEP, which is pleasing, but partly also by the fact that the pupils themselves are interested in these topics and study them independently within their out-of-school activities. The need for lifelong learning is nowadays a necessity, and it is gratifying that pupils although in the area that is close to them (e.g. the concept of digital natives, Prensky, 2009, etc.) are already aware of this fact at such a relatively young age. Although this claim can be considered a pure speculation that cannot be based on any relevant data, we are convinced that this idea has a real basis. It is based primarily on the personal experience of almost every teenager's parents, who will surely confirm the speed at which their children are able to penetrate into new technologies and use new devices, when they are really interested in them and want to present themselves to their friends, even within social networks (e.g. the phenomenon of the so-called YouTubers, etc.).

If we realize that the development of digital technologies is very fast, and its goal is also to bring these technologies closer to the users, the obtained results will not be surprising at all. Projects,

programs and multimedia records which are especially popular with pupils today (the phenomenon of the so-called YouTubers, etc.), and which could have been previously created only with the use of specialized professional programs and equipment, can nowadays be created and edited using many native applications that are often part of operating systems. Their operation is also not complicated and the desired outcome can be reached in a relatively short period of time, with reasonable effort. The pupils unconsciously feel the need to deepen these topics further within their school education, combining thus the content of school preparation with their personal life or interests. However, the question is whether these efforts do not interfere with some of the unfavourable phenomena related to social networking and the Internet (e.g. Kopecký, 2015). It could be expected that pupils, apart from the "traditional" IT topics, might be interested also in the "non-traditional" ones, either because of their relative novelty (from their subjective point of view), or because of the above mentioned need to increasingly penetrate into the secrets of modern digital technologies.

However, interesting is also the fact that, if we compare the obtained results, the greatest difference between the declared interest and the declared level of knowledge of the pupils, in favour of the expressed interest, can be seen in the thematic units of "Programming and algorithm development", "Touch device operation", "Technical Figureic system use", "Sound and video handling", "Robotics and electronical construction sets" and "Website creation and administration". These thematic units although the pupils declared a relatively low level of knowledge in them are interesting from their point of view, and they would like to be educated in them.

Literature:

1. Ala-Mutka, K.: *Mapping digital competence: towards a conceptual understanding*. Luxembourg: Publications Office of the European Union. 2011. Available from: http://ftp.jrc.es/EURdoc/JRC67075_TN.pdf
2. CSTA.: *K-12 Computer Science Standards*. [online]. 2011. Available from: http://www.csta.acm.org/Curriculum/sub/CurrFiles/CSTA_K-12_CSS.pdf
3. European Commission.: *Opening up education: Innovative teaching and learning for all through new technologies and open educational resources*. Brussels: Commission of European Communities. 2013. Available from: http://ec.europa.eu/education/news/doc/openingcom_en.pdf
4. Ferrari, A.: *DigComp: A framework for developing and understanding digital competence in Europe*. Luxembourg: European Commission. 2013. Available from: <http://ftp.jrc.es/EURdoc/JRC83167.pdf>
5. Chráška, M., Kočvarová, I.: *Kvantitativní metody sběru dat v pedagogických výzkumech*. Zlín: Univerzita Tomáše Bati ve Zlíně, Fakulta humanitních studií. 2015. 132 p.
6. Klement, M., Dostál, J., Bártek, K.: *Perception and Possibilities of ICT Tools in the Education from the Teachers' Perspective*. Olomouc – EU: Palacký University. 2017. Doi: 10.5507/pdf.17.24450933, 241 p.
7. Maul, A., Irribarra, D.T., Wilson, M.: On the philosophical foundations of psychological measurement. *Measurement* 79, 2016. pp. 311-320.
8. MŠMT.: *Strategie vzdělávací politiky České republiky ro roku 2020*. 2014a. Available from: http://www.msmt.cz/file/3442_9_1_1
9. MŠMT.: *Strategie digitálního vzdělávání do roku 2020*. 2014b. Available from: <http://www.msmt.cz/vzdelavani/skolstvi-v-cr/strategie-digitálního-vzdelavani-do-roku-2020>
10. MŠMT.: *Rámcový vzdělávací program pro základní vzdělávání*. Praha. 2017. Available from: http://www.msmt.cz/file/43792_1_1/RVP_ZV_2017_červen.pdf
11. Pfitzner, D., Leibbrandt, R., Powers, D.: Characterization and evaluation of similarity measures for pairs of clusterings. *Knowledge and Information Systems*. Springer. 19 (1). 2009. pp. 361–394.
12. Prensky, M.: *Homo Sapiens Digital: From Digital Immigrants and Digital Natives to Digital Wisdom*. *Innovate* 5(3). 2009. Available from: <http://www.innovateonline.info/pdf>

- /vol5_issue3/H_Sapiens_Digital_From_Digital_Immigrants_and_Digital_Natives_to_Digital_Wisdom.pdf
13. Rada Evropské Unie.: *Závěry rady o úloze vzdělávání a odborné přípravy při provádění strategie Evropa 2020*. 2011. Available from: <http://bit.ly/1p4qF8U>
14. Rambousek, V. et. al.: *Rozvoj informačně technologických kompetencí na základních školách*. Univerzita Karlova, Pedagogická fakulta UK, Dopravní fakulta ČVUT. Praha: České vysoké učení technické. 2013.
15. Rambousek, V., Štípek, J., Wildová, R.: ICT competencies and their development in primary and lower secondary schools in the Czech Republic. *5th ICEEPSY International Conference on Education & Educational Psychology. Procedia-Social and Behavioral Sciences*. Istanbul: Turkey. 2015. pp. 535–542.
16. Ribeiro, L., Nunes, D. J., Kniphoff D. M., De Souza, M. E.: Computational Thinking: Possibilities and Challenges. *Theoretical Computer Science (WEIT) 2013 2nd Workshop-School on*. 2013. pp. 22–25.
17. Strnad, M. *Přenositelnost transformace ICT výuky na 2. stupni v Anglii do českých podmínek*. Unpublished diploma thesis. Praha: Univerzita Karlova. 2015.
18. Štípek, J., Rambousek, V., Vaňková, P. Vybrané výsledky výzkumu rozvoje digitálních kompetencí žáků na ZŠ. *Pedagogika*, 65(3), 2015. pp. 259–273.
19. The Royal Society.: *Shutdown or restart?: The way forward for computing in UK schools*. Education Section. London. 2012. Available from: <https://royalsociety.org/~media/education/computing-in-schools/2012-01-12-computing-in-schools.pdf>
20. Tupý, J.: *Tvorba kurikulárních dokumentů v České republice: historicko-analytický pohled na přípravu kurikulárních dokumentů pro základní vzdělávání v letech 1989-2013*. Brno: Masarykova univerzita. 2014.
21. Walterová, E. et al.: *Úloha školy v rozvoji vzdělanosti, 1. a 2. díl*. Brno: Paido. 2004.
22. Wing, J. M.: Computational thinking. *Commun. ACM* 49, 2006. pp. 33–35.
23. Ying, L., Yu, L., Pan, S.: Teaching research and practice of blended leaning model based on computational thinking. *Frontiers in Education Conference (FIE). IEEE*, 2015. pp. 1-8.

Primary Paper Section: A

Secondary Paper Section: AM

REVENUE EFFICIENCY IN THE CZECH REPUBLIC AND SLOVAKIA

^aKRISTINA KOCISOVA, ^bPETER SUGEREK

Technical University of Košice, Faculty of Economics, Nemcovej 32, 04001 Kosice, Slovakia
 email: ^a*Kristina.Kocisova@tuke.sk*, ^b*Peter.Sugerek@tuke.sk*

This research was supported by the Slovak Scientific Grant Agency as part of the research project VEGA 1/0794/18 "Development of methodological platform for evaluation of efficiency in the financial and non-financial sector".

Abstract: This paper applies the DEA to evaluate revenue efficiency using the traditional (TRE) and new (NRE) model. We show how to make the relevant calculations in RStudio and discuss application in the banking area. Using balanced panel data from 2008 to 2017, we compared the efficiency of Czech and Slovak banks. The results showed that the TRE ranged from 24.15% to 100%, and NRE ranged from 29.68% to 100%. The results showed that a higher efficiency was in the case of banks located in Czech Republic and pointed to the fact that large banks were the most efficient. The results of nonparametric test for equality of densities pointed to the fact that it depends on selected methodology, bank size and also the location of banks. The results were also verified by the GMM model, which signaled, that the level of efficiency depended mainly on the efficiency in the previous year, but also on the location of the bank in the new revenue model.

Keywords: Bank, Czech Republic, Data Envelopment Analysis, Distributional approach, Generalised Method of Moments, Revenue efficiency, Slovakia, RStudio.

1 Introduction

Commercial banks represent the largest segment of the Czech and Slovak financial system. Both countries could be considered as representatives of the bank-oriented financial system, where the commercial banks play a crucial role. According to data published by the National bank of Slovakia and Czech national bank, we can say that the share of commercial banks assets on the total assets of all financial intermediaries is higher than 60%. There is, therefore necessary, to study efficiency of these institutions in order to differentiate the efficient one from non-efficient ones and to find out which conditions are the most prerequisite to becoming efficient. When measuring efficiency based on the non-parametric DEA method, there are two different situations: one with common unit prices of outputs for all Decision-Making Units (DMUs) and the other with different prices of outputs from unit to unit. The concept of revenue efficiency was first introduced by Farrell (1957) and then developed by Färe et al. (1985). In this model, they assumed that output prices are the same across all units. However, the common price and revenue assumption is not always valid in real business, and it has been shown that efficiency measures based on this assumption can be misleading. So a new revenue efficiency model was introduced by Tone (2002). In our paper we want to compare the results obtained with the traditional and new revenue model. We want to present the usage of these methods in efficiency evaluation in software RStudio, namely through the application of package "Benchmarking".

This study aims to examine the revenue efficiency of the Czech and Slovak banks using the DEA and try to answer the research question whether the efficiency differs across banks with different size, and banks from different countries. The efficiency is evaluated in a sample of 14 banks during the period from 2008 to 2017 based on the unconsolidated data published within annual reports of analysed banks. In the next step, the estimated efficiencies are tested for equality of densities of two given distributions via the test prepared by Li et al. (2009). Then the system generalised method of moments (GMM), is applied to analyse if the efficiency in the previous year, location and bank size can be considered as variables with significant impact on bank efficiency. This study contributes to the existing literature by comparing of traditional and new revenue model and by examining the statistical differences in equality of efficiencies in terms of the size and location. One of the benefits of the paper is filling the current gap in the scientific literature, as this type of analysis is missing in the literature concerning the banking sectors in the Czech Republic and Slovakia.

To fulfil the aim of the paper, the structure of the paper is as follow. The review of the relevant literature is described in the second section. The third section describes the methods. Next, the fourth section presents the data and results. In last section, we conclude the paper.

2 Literature review

The literature on bank efficiency has expanded during the last years, where the researchers started to prefer parametric and nonparametric methods to evaluate the revenue efficiency instead of ratio analysis. As mentioned by Dong et al. (2014), since both parametric and non-parametric approaches have their advantages and limitations and since the actual level of revenue efficiency is unknown, the choice of an appropriate efficiency estimation approach has been quite controversial. Therefore, in the banking area, some researches, for example, Rossi et al. (2005), Olson & Zoubi (2011), or Ghroubi & Abaoub (2016), prefer parametric method, while some researches like Havranek & Irsova (2013), Pancurova & Lyócsa (2013), Siranova & Cupic (2015), Prior Jiménez et al. (2016), Gavurova et al. (2017), Černohorská et al. (2017), Cupic & Siranova (2018), Phang & Raweewan (2018), or Palečková (2019), mainly used the non-parametric approach. We can also find several studies, for example, Delis et al. (2009), Irsova (2009), Tan (2016), Dinh et al. (2019) or Ruinan (2019) comparing the results of revenue efficiency estimated by both methods simultaneously. Most of these studies apply the traditional revenue efficiency frontier. However, in the study of Pancurova & Lyócsa (2013), we can also find the application of a new revenue efficiency function.

Havranek & Irsova (2013) analysed what drove bank cost and revenue efficiency in the transition countries of Central Europa and compare results with those for the United States. They applied the traditional DEA model to evaluate efficiency for the period of 1995-2006, based on intermediation approach. They found out that the largest banks were most revenue efficient. Also, foreign banks reported higher cost and revenue efficiency. The revenue efficiency was higher than cost efficiency, which signalled that banks were more successful in gaining profits on average.

Pancurova & Lyócsa (2013) estimated efficiencies and their determinants for a sample of eleven Central and Eastern European Countries over the 2005-2008 period. They estimated cost and revenue efficiency using new DEA models. Within the second stage, they tested the separability assumption and estimated determinants of efficiency by using a truncated regression model. They found out that the size and financial capitalisation of banks were positively associated with cost and revenue efficiency, while the loans-to-assets ratio was negatively associated with cost efficiency but positively associated with revenue efficiency. Moreover, foreign banks were more cost-efficient but less revenue efficient than domestic banks, suggesting different banking behaviour between domestic and foreign banks.

The impact of concentration on bank profitability was analysed in the study of Černohorský (2015) who used correlation and regression analysis in the Czech banking sector during the period 2003-2012. He found out that there existed an inverse relationship between the degree of concentration and the size of the profits of the banking sector, which is not the standard output of previous studies.

Siranova & Cupic (2015) investigated the influence of Slovakia accession to the European Union on the efficiency of Slovak banks over the period 2001-2009. They found out a significant association between accession and bank efficiency. Also, the found small banks were more efficient than large banks, which was partly because large banks were oversised and operated at the decreasing returns to scale. They also analysed the impact of accession into the Euro area using data for the period 2000-2013. Cupic & Siranova (2018) suggested that the efficiency of Slovak

banks was not affected by macroeconomic conditions and banking reforms, which was in line with the argument that Slovak banking sector was in the advanced stage of development when the influence of these factors was of less importance. During this period, large banks were more efficient than small banks, and foreign banks were more efficient than domestic ones.

Prior Jiménez et al. (2016) focused on the Spanish banking sector for the 2005-2009 period. They applied traditional DEA method to evaluate cost and revenue efficiency of Spanish commercial banks, savings banks and credit unions during both the pre-crisis years (from 2005 to 2007) and crisis years (2008 and 2009). They applied Li et al. (2009) test to analyse differences between groups of banks according to the type of bank and crisis years. They found out that differences did not exist when comparing saving banks and credit unions. In contrast, commercial banks were more efficient than the other two bank types.

Gavurova et al. (2017) examined the cost and revenue efficiency of banking sectors within the European Union countries over the period 2008-2015. After the estimation of efficiencies, they tested if there exist differences in term of size, European region and crisis years. They found out that the results differ in the specified group, so they concluded that the results of analysis depended on size, location and crisis period.

Phang & Raweevan (2018) examined the cost, revenue and profit efficiency of the Cambodian banking system over the period 2010-2013 by traditional DEA model. They found out that large banks were more cost, revenue and profit efficient than smaller counterparts. Moreover, foreign banks, on average, were more cost, revenue and profit efficient than domestic banks. Results suggested that the banking sector still had the potential for cost savings as well as revenue and profit increases.

Ruinan (2019) applied both SFA and traditional DEA to evaluate cost and profit efficiency of the largest banks in the United States and Canada for the 2008-2017 period. The results regarding cost and profit efficiency confirmed the prior studies indicating a low correlation between these two measures. However, SFA and DEA produced very different and uncorrelated results, though DEA generated overall lower efficiencies. The findings suggested that methodology cross-checking, along with information regarding variables selection, are necessary before decision making.

The determinants of bank efficiency were also evaluated by Palečková (2019), who found out that larger banks with higher liquidity risk and with the lower value of the net interest margin were more efficient than smaller ones. According to the results, we can say that banks were highly efficient during the economic expansion with a lower value of the inflation rate.

The last mentioned, Dinh et al. (2019) evaluated efficiency of 30 commercial banks in Vietnam using both parametric (SFA) and non-parametric (DEA) approach during the period of 2011–2015. They applied Tobit regression model, to investigate the impact of bank size, bank age, and the ownership feature on the efficiency. They found out that there is small level of similarity in efficiency rankings identified from the SFA and DEA models. In terms of efficiency determinants, the results showed that all three variables of size, age, and state ownership have a positive impact on bank efficiency.

3 Methodology

Charnes et al. (1978) first developed the Data Envelopment Analysis (DEA) under the constant returns to scale assumption and this way provided a measure of technical efficiency. Following Farrell (1957), and Färe et al. (1985), a sequence of linear programmes was applied to construct revenue efficiency frontiers, which is now used to measure traditional revenue efficiency. Berger & Mester (1997) argue that revenue efficiency measures the change in a bank's revenues adjusted for a random error, relative to the estimated revenues obtained from producing

an output as efficient as the best practice bank. According to Tan (2016), revenue efficiency emphasises the fact that the banking operations aim to maximise revenues. The traditional revenue efficiency model (TRE) assumes that the unit price of outputs is identical among DMUs. According to the Pancurova & Lyócsa (2013), to be revenue efficient, the DMU must be both technically efficient (adopting the best practice technology) and allocative efficient (selecting the optimal mix of outputs to maximise the revenues for a given input).

We define \mathbf{y}_o as the $s \times 1$ vector of the o -th production unit's s outputs ($r=1, \dots, s$), \mathbf{x}_o is the $m \times 1$ vector of its m inputs ($i=1, \dots, m$), \mathbf{Y} is the $s \times n$ matrix of outputs (n denotes the number of DMUs, ($j=1, \dots, n$), and \mathbf{X} is the $m \times n$ matrix of inputs. Let us consider we have prices associated with outputs. Let $\mathbf{p} = (p_1, \dots, p_s)$ be the common unit output-price or unit-revenue vector. Then the revenue efficiency ρ of DMU_o is defined as the ratio between the actual revenues and maximal revenues. Where maximal revenues are calculated through the optimal solution of the constant returns to scale revenue maximisation model. For detail description of model see Cooper et al. (2007).

In traditional revenue efficiency DEA models, we assume that output prices are the same across all decision-making units. However, actual markets do not necessarily function under perfect competition, and unit output prices might not be identical across all DMUs. As pointed out by Tone (2002), the traditional DEA revenue efficiency model does not take account of the fact that revenues can be increased by increasing the output factor prices. Under the traditional DEA model, the revenue function is homogeneous of degree one in output prices, and the scaling factor cancels out in the revenue efficiency ratio, and thus, the two DMU will be assigned the same measure of revenue efficiency irrespective of the fact that they have significantly different output prices. It represents a severe drawback for assessing relative efficiency levels under the traditional DEA model as it is caused by the peculiar structure of the DEA model which exclusively focuses on the technical efficiency of two DMU and cannot take account of variations in unit output prices between the DMUs. Therefore, in order to avoid this shortcoming, Tone (2002) proposed a new scheme for evaluating revenue efficiency under which the production technology is homogeneous of degree one in the total revenues as distinct from being homogeneous of degree one in the output prices under the traditional DEA model. As mentioned by Dong et al. (2014), it means that under the new DEA model DMUs with different output prices will return different measures of revenue efficiency.

The new revenue efficiency model (NRE) is based on the definition of another revenue-based production possibility set P_R as $P_R = \{(x, \bar{y}) \mid x \geq X\lambda, \bar{y} \leq \bar{Y}\lambda, \lambda \geq 0\}$. Where $\bar{Y} = (\bar{y}_1, \dots, \bar{y}_n)$ with $\bar{y}_j = (p_{1j}y_{1j}, \dots, p_{sj}y_{sj})$. Here we assume that the matrices Y and P are non-negative, and elements of $\bar{y}_{rj} = (p_{rj}y_{rj} \mid \forall (r, j))$, are denominated in homogeneous units in monetary terms (e.g. euro). According to Cooper et al. (2007), the new revenue efficiency $\bar{\rho}_o$ is defined:

$$\bar{\rho}_o = \frac{e\bar{y}_o}{e\bar{y}_o^*} \quad (1)$$

Where $e \in R^m$ is a row vector with elements being equal to 1, and \bar{y}_o^* is the optimal solution for the linear programmes given below:

$$\text{New Revenues} \quad e\bar{y}_o^* = \max_{\bar{y}, \lambda} e\bar{y} \quad (2)$$

$$\text{Subject to } x_o \geq X\lambda; \bar{y} \leq \bar{Y}\lambda; \lambda \geq 0 \quad (3)$$

In the new revenue efficiency model the optimal output mix \bar{y}_o^* that uses the input x_o can be found independently of the DMU's current unit price p_o , whereas in the traditional revenue efficiency model keeping the unit revenue of DMU j fixed at p_o when we was searching for optimal output mix y^* . These are fundamental differences between the two models. Using traditional revenue efficiency model, we can fail to precisely the existence of other more profitable output mixes. We can demonstrate a simple example involving three DMUs A, B and C with each using one input (x) to produce two outputs (y_1, y_2) along with output prices (p_1, p_2) . The data and the resulting measurement are exhibited in Tab. 1. For DMUs A, B and C, the traditional revenue model gives the same efficiency score $\rho^* = 1$. As they used the same amount of input to produce the same amount of outputs, we can consider them as technical efficient. The traditional revenue model assumes that the unit price of outputs is identical among, so do not take into account the actual prices of production units.

Tab. 1: Comparison of traditional and new revenue efficiency

	DMU A	DMU B	DMU C
x	1	1	1
y_1	10	10	10
y_2	10	10	10
p_1	10	1	1
p_2	10	1	10
\bar{y}_1	100	10	10
\bar{y}_2	100	10	100
$\bar{y} = \bar{y}_1 + \bar{y}_2$	200	20	110
e_1	1	1	1
e_2	1	1	1
Traditional revenue model ρ^*	1.00	1.00	1.00
New revenue model $\bar{\rho}^*$	1.00	0.10	0.55

Source: Prepared by authors according to Cooper et al. (2007)

The new scheme devised as in Tone (2002) distinguishes DMU A from DMU B and DMU C by according them different revenue efficiency scores. This is due to the difference in their unit revenues. Moreover, DMU A is judged as revenue efficient. We can also see the drop in DMU C from 1 to 0.55 and in the case of DMU B from 1 to 0.10. We can explain the drop in DMU B's and DMU C's performance by their lower revenue structure. We can see that DMU B produces ten units of output 1 with a price of 1 price unit per one unit and ten units of output 2 with a price of 1 price unit per one unit. It means that by using the same amount of input, DMU B can generate a lower total revenue equal to 20 price units. In case of DMU C, we can see that it produces ten units of output 1 with a price of 1 price unit per one unit and ten units of output 2 with a price of 10 price unit per one unit, which generates total revenues equal to 110 price units. The last one, DMU A produces ten units of output 1 with a price of 10 price unit per one unit and ten units of output 2 with a price of 10 price units per one unit, which generates total revenues equal to 200 price units. It indicates, that all DMUs use the same amount of input to produce the same amount of outputs, but when we take into account different unit prices, we can see, that the total revenues of production units are different, therefore we could not consider them as the same revenue efficient. When we would like to consider DMU B and DMU C also as efficient, it is necessary to increase their revenues to the optimal level of 200 price units, the same as it is in the case of DMU A. There are two main ways how to obtain the optimal revenues. The first one is to increase the prices at the same level as it is in the case of DMU A. It means that the DMUs will produce the same amount of outputs at the same

level of their prices by using the same level of inputs. However, in this situation, the DMUs could not get a competitive advantage in the form of prices. The second way is to increase the level of the produced outputs. In the case of DMU B, to obtain the optimal revenues, it is necessary to increase the production of first output from 10 to 100 units, and the production of second output also from 10 to 100 units. In the case of DMU C, it should increase the production of the first output from 10 to 100 units at the unchanged level of second output. This way, the production units will be able to obtain the same level of optimal revenues without changing the level of their prices. As we suppose that on the market the consumers prefer products with lower prices, we can suppose that the DMU B with the lowest prices can get a competitive advantage, gain more consumers, and this way by selling the higher amount of products can get the same level of optimal revenues.

Having estimated revenue and new revenue efficiency, we will test distributions of efficiencies for two sub-groups. Li et al., (2009) proposed a nonparametric test for equality of multivariate densities, comprised of continuous and categorical data. Let X and Y be multivariate vectors of dimension $q+r$, where q denotes the number of variables from the first sample, and r denotes the number of variables from the second sample. According to Racine (2012) test statistic can be constructed based on the integrated squared density difference given by

$$I = \int [f(x) - g(x)]^2 dx = \int [f(x)dF(x) + g(x)dG(x) - f(x)dG(x) - g(x)dF(x)] \quad (4)$$

where $F(\cdot)$ and $G(\cdot)$ are the cumulative distribution functions for X and Y , respectively, and where $\int dx = \sum_x^d \in s^d \int dx^c$. Replacing the first occurrences of $f(\cdot)$ and $g(\cdot)$ by their leave-one-out kernel estimates, and replacing $F(\cdot)$ and $G(\cdot)$ by their empirical distribution functions, we obtain the test statistics (for more detail see Li et al. (2009) and Racine (2012)). Based on this methodology and based on the paper by presented by Prior Jiménez et al. (2016), we used the nonparametric test for equality of densities to test whether two given distributions, say $f(\cdot)$ and $g(\cdot)$, estimated nonparametrically via kernel smoothing, differ statistically in terms of the bank size, and in terms of location. Based on this methodology and based on the paper presented by Prior Jiménez et al. (2016), we used the nonparametric test for equality of densities to test whether two given distributions estimated nonparametrically via kernel smoothing, differ statistically.

To verify our findings, in the last step we apply the system generalised method of moments (GMM), which is appropriate to deal with explanatory variables that are not strictly exogenous. We involve dummy variables into the model, as we want to analyse if the location and bank size can be considered as variables with a significant impact on bank efficiency. The model is defined as follows:

$$y_{i,c,t} = \alpha y_{i,c,t-1} + \beta \text{DummyLocation}_{i,c,t} + \gamma \text{DummySize}_{i,c,t} + \varepsilon_{i,c,t} \quad (5)$$

Where $y_{i,c,t}$ is the revenue efficiency of the bank i in the country c at the time t measured via traditional or new revenue model; $y_{i,c,t-1}$ is the revenue efficiency of the bank i in the country c at the time $t-1$; $\text{DummyLocation}_{i,c,t}$ is a dummy for the country where bank i is located at the time t , and $\text{DummySize}_{i,c,t}$ is the dummy for the bank size.

3 Results and discussion

We will illustrate using revenue DEA models under the assumption of a variable returns to scale, to measure the revenue and new revenue efficiency of commercial banks in the Czech Republic and Slovakia. We assume seven commercial banks located in the Czech Republic and seven commercial banks

located in Slovakia. In our research, we have focused only on the evaluation of domestic commercial banks; the foreign-controlled branches were not involved. The analysis is based on the data of domestic banks, which comprises more than 77% of total banking assets in 2017 in the case of Slovakia, and more than 70% of total banking assets in 2017 in the case of Czech Republic. The data are taken for the period from 2008 to 2017. All data were reported in EUR as the reference currency. The data in the national currency (Česká koruna – CZK), were converted by using the official exchange rate of the Czech National Bank at the end of the specified year. The source of the unconsolidated data is annual reports of analysed banks. Based on the literature review, we adopt the intermediation approach for selecting inputs and outputs of banks. The intermediation approach is the primary approach for modelling of banking activity, focusing in particular on the role of banks as financial intermediaries between depositors and end-users of bank assets. As mentioned by Sealey Jr & Lindley (1977) deposits and other liabilities, together with real resources are treated as inputs, whereas outputs include only bank assets that generate revenues. We consider three inputs: The number of full-time employees (x_1), Total fixed assets in thousands of EUR (x_2), and Total deposits in thousands of EUR (x_3). We include two outputs: Total loans in thousands of EUR (y_1), and Total other earning assets thousands of EUR (y_2). Let denotes p_1 the price of output y_1 , and p_2 the price of output y_2 . The price of loans (p_1) in EUR can be calculated as the ratio of total interest income to total loans, and the price of other earning assets (p_2) in EUR can be calculated as the ratio of non-interest income to total other earning assets.

Practical calculation of revenue and new revenue efficiency is realised using the software RStudio. RStudio is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS and can be downloaded on the web page: <https://rstudio.com/>. RStudio is very much a vehicle for newly developing methods of interactive data analysis. It is developing fast and has been extended by an extensive collection of packages. However, most programs written in R are principally ephemeral, written for a single piece of data analysis. (www.r-project.org). One of the packages is a package „Benchmarking”, prepared by Bogetoft et al. (2018). Bogetoft & Otto (2010) in their work used software R for calculating efficiency not only for DEA models but also for SFA models. The package „Benchmarking” contains methods to estimate technologies and measure efficiency using DEA while supporting different technology assumptions (Free disposability hull, Variable returns to scale, Constant returns to scale, Decreasing returns to scale, Increasing returns to scale), and using different efficiency measures (Input based, Output based, Hyperbolic graph, Additive efficiency, Super efficiency, Directional approach). The methods can solve not only standard models, but also many other model variants, and they can be modified to solve new models. As we want to eliminate the frontier shift effect, the data are evaluated within one sample, not separately for each year. This way, the efficiency frontier is estimated from all observed values.

To solve the traditional revenue maximisation problem using RStudio, we first load the data from MS Excel file, where the file is prepared for each year separately (*data.xls*). The next step requires to install the package Benchmarking. In the next step, we have to apply the revenue maximisation DEA model, using the procedure *revenue.opt* from the Benchmarking package. This command estimates the optimal output vector (*yopt*) that maximises revenues in the context of a DEA technology. The part of the command is to define which variables will act as inputs (the matrix of inputs, x), outputs (the matrix of outputs, y), output prices (as a matrix, p) and used technology (variable returns to scale “*vrs*”) of the applied model. To calculate traditional revenue efficiency, we have to find the actual

revenues ($robs = \sum_{r=1}^s p_{rq} \cdot y_{rq}$) and the optimal revenues ($ropt$

$= \sum_{r=1}^s p_{rq} \cdot y_{rq}^*$), and then we divide the actual revenues by the

optimal revenues. It is calculated in R by using the inner product $\%*\%$, or matrix multiplication where the function t is matrix transposed. For calculation of traditional revenue efficiency, it is necessary to select data from diagonals of formed matrices (*pobs1*; *popt1*). By dividing these values, we obtain traditional revenue efficiency (*tre*) of evaluated banks. The process of calculation of traditional revenue efficiency by using RStudio can be entered via the following commands:

```
data = read_excel("C:/...../data.xlsx")
library("Benchmarking")
x = with(data, cbind(x1,x2,x3))
y = with(data, cbind(y1,y2))
p = with(data, cbind(p1,p2))
yopt1 = revenue.opt(x,y,p, RTS="vrs")
robs = y %*% t(p)
ropt = yopt1$yopt %*% t(p)
ropt1 = diag(ropt)
robs1 = diag(robs)
tre = robs1/ropt1
print(cbind("tre"=c(tre)), digits=4)
```

By multiplying the total loans (y_1) and a total other earning assets (y_2) with their respective unit revenues (p_1, p_2), we obtain new output data set (yn) which can be used to calculate new revenue efficiency. By switching original output prices directly to the new output, the price data does not enter the new model but is replaced by the row vector with elements being equal to 1 (e_1, e_2). This new data set is used in the process of revenue maximisation DEA model, using the procedure *revenue.opt*. To calculate new revenue efficiency, we also have to find the actual revenues (*robsn*) and the optimal revenues (*roptn*), and then we divide the actual revenues by the optimal revenues. By dividing values from the diagonals of matrices (*robs1n*; *ropt1n*), we obtain new revenue efficiency (*nre*) of evaluated banks. The process of calculation of new revenue efficiency by using R can be entered via the following commands:

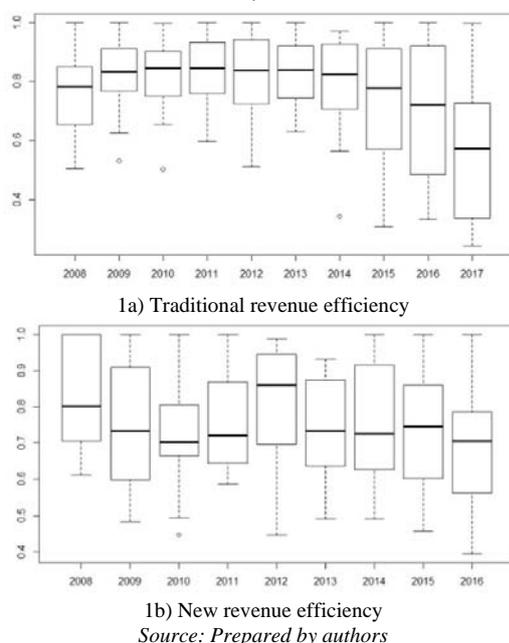
```
x = with(data, cbind(x1,x2,x3))
yn = with(data, cbind(y1*p1,y2*p2))
pn = with(data, cbind(e1,e2))
ynoptin = revenue.opt(x,yn,pn, RTS="vrs")
robsn = yn %*% t(pn)
roptn = ynoptin$yopt %*% t(pn)
ropt1n = diag(roptn)
robs1n = diag(robsn)
nre = robs1n/ropt1n
print(cbind("nre"=c(nre)), digits=4)
```

According to the methodology described in the previous section, we evaluate the revenue and new revenue efficiency of Czech and Slovak banks. The results are presented in the following order. First, we report the estimates of overall revenue and new revenue efficiency during 2008-2017. Next, we use univariate cross-tabulation to trace revenue and new revenue efficiency under the alternative classification based on different parameters like bank size and location. As mentioned by Ray & Das (2010), the univariate approach does not satisfactorily analyse the distributional structure of the efficiency estimates. To analyse this aspect, the entire distribution of efficiencies based on kernel densities under various conditioning schemes is also presented.

Figure 1 presents the results of revenue and new revenue model. When we look at the results of the traditional revenue model, we can see a decline during the last years of the analysed period. The median values were approximately at the same level during the period from 2008 to 2015. As we can see under this approach the most inefficient banks should be considered as outliers within the sample in 2009, 2010 and 2014, as most of the efficiencies were located within the interval of approximately 0.6-1. The minimum average value was reached in 2017, the maximum average value in 2013. The average revenue efficiency at the beginning of the analysed period was 77.38% indicating that on average, banks could increase their revenues by 22.62% by producing outputs in optimal combination under a given level of inputs. At the end of the analysed period, the average revenue efficiency was 56.64%, indicating potential

revenue increase equal to 43.36%. Under the new revenue model, the outlier can be seen only in 2010. We can see a decline until 2010, with a slight increase between 2010 and 2012, which was replaced by a decreased since 2012. The minimum average value was reached in 2017, the maximum average value in 2008. The average new revenue efficiency at the beginning of the analysed period was 82.41% indicating that on average, banks could increase their revenues by 17.59% by producing outputs in optimal combination under while maintaining the given output prices and with a given level of inputs. At the end of the analysed period, the average new revenue efficiency was 63.11%, indicating potential revenue increase equal to 36.89%. Generally, based on the results displayed in Figure 1, we can say that analysed banks were more efficient under the new revenue model than under the traditional revenue model. As the reason of decline in revenue efficiency can be considered the decline in interest rates set up by central banks in both countries. This decline was pass-through into the interest rates on the interbank market, and also into the interest rates connected on bank products like bank loans and bank deposits. Due to the decline in interest rates for loans, banks were not able to generate such a high value of interest income as at the beginning of the analysed period. While at the beginning of the analysed period the commercial banks were able to generate interest income with an average value of 509604 thousand of EUR at the end of the analysed period it was only 389686 thousand of EUR. As we know, the commercial banks try to replace this loss of interest income by decreasing operating expenses or by increasing non-interest income to prevent a decline in their profitability. Therefore, in case of non-interest income, we can see an increase during the analysed period. While at the beginning of the analysed period the commercial banks were able to generate interest income with an average value of 115932 thousand of EUR at the end of the analysed period it was only 160239 thousand of EUR. We could see that the banks were able to increase their non-interest income, but the increase was not so high compared to the decline in interest income. Therefore, we can suppose that this fact had a negative impact on banks revenue efficiencies during the last years of the analysed period.

Figure 1: Revenue efficiencies given by DEA models according to years



In the univariate approach, the estimates efficiency scores are analysed by a single attribute. Tab. 2 presents the results according to the location. Under both approaches, Czech banks appeared as the more efficient as the average efficiencies of Czech banks were higher than Slovak ones. On the other hand, Slovak banks reached lower average efficiencies. A higher decline in interest rates can explain the generally lower

efficiency of Slovak banks compared to the Czech banking sector. As it was mentioned this decline had a negative impact on generating interest income of commercial banks. The development of the average traditional revenue efficiency in two groups of banks indicates a decline in the efficiency in the case of Slovak banks, while the efficiency in case of Czech banks was relatively stable till 2016 and then decrease can be seen in last year of the analysed period. The similar development could be also seen in the case of new revenue model, but decline in last year in the case of Czech banks is not so significant.

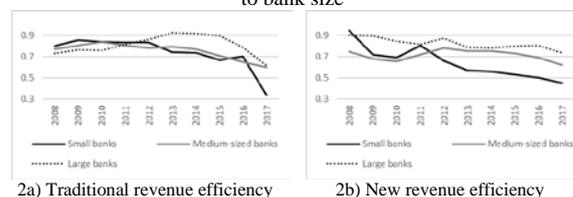
Tab. 2: Location and revenue efficiencies given by DEA models

Country (No. of banks) Year	Traditional revenue model ρ^*		New revenue model $\bar{\rho}^*$	
	Czech Republic (N = 7)	Slovakia (N = 7)	Czech Republic (N = 7)	Slovakia (N = 7)
2008	0.8340	0.7136	0.8712	0.7769
2009	0.8270	0.8111	0.8750	0.6268
2010	0.8485	0.8012	0.7954	0.6393
2011	0.8604	0.7785	0.7951	0.7272
2012	0.8505	0.7880	0.9139	0.6766
2013	0.9112	0.7425	0.8350	0.6432
2014	0.9112	0.6722	0.8397	0.6314
2015	0.8356	0.6357	0.8528	0.5925
2016	0.8231	0.5776	0.9393	0.5555
2017	0.6336	0.4992	0.7677	0.4945
2008-2017	0.8335	0.7020	0.8385	0.6364

Source: Prepared by authors

The relationship between efficiency and size of banks is presented in Figure 2. The analysed banks were divided into three groups: small banks, medium-sized banks and large banks. In terms of absolute amounts, the threshold is defined based on the total assets of the analysed banks during the whole analysed period. Within the group of small-sized banks, there are banks with assets less than 25th percentile of assets of all analysed banks. Within the group of medium-sized banks, there are banks with assets between 25th and 75th percentile of assets of all analysed banks. Moreover, within the group of large-sized banks, there are banks with assets higher than 75th percentile of assets of all analysed banks. The results indicate that large banks were more efficient than small and medium-sized banks. In past years the last efficient were small banks under both approaches. In the case of large banks, the minimum average value of traditional revenue model was reached in 2017, the maximum average value in 2013. In the case of the medium-sized banks, the minimum was also reached in last year and a maximum in 2010. In the case of the small banks, the minimum was reached in 2017 and a maximum in 2009. In the case of a new revenue model, the decline tendency can be seen in all types of banks with the minimum values in the last years.

Figure 2: Revenue efficiencies given by DEA models according to bank size



The presented results pointed to the differences between banks located in different countries, and also with different size. Therefore, we now turn to the analysis of the distribution of revenue and new revenue efficiency. We apply the test presented by Li et al. (2009), to compare if there exist significant differences between both approaches, and also between different size groups and groups according to location.

The comparative analysis of the different location performed in Tab. 3 reveals that there exist significant differences between the efficiencies of banks in Slovakia and in the Czech Republic at a 1% level. A higher value of T-statistics can signify more significant differences between countries. Based on this

assumption, we can say that the more significant differences were between banks in new revenue models. Based on the results of the analysis presented in Tab. 3, we can generally say that it depends on whether the bank is located in the Czech Republic or Slovakia. So we can confirm our research question that it depends on the location of the bank.

Tab. 3: Distribution hypothesis tests by location

		Traditional revenue model ρ^*	New revenue model $\bar{\rho}^*$
f(Slovakia) = g(Czech Republic)	T-statistics	12.2624	17.0163
	p value	0.0000	0.0000

Note: The functions f(·) and g(·) are (kernel) distribution functions for each model being compared.

Source: Prepared by authors

Results in Tab. 4 account for significant differences between the efficiencies of banks in different size groups at a 1% level. The significant differences can be seen in the case of traditional and new revenue model in a whole sample. Based on the results of this analysis, we can, therefore, say that it depends on whether the bank is large, medium-sized or small. So we can confirm our research question that it depends on the size of the bank.

Tab. 4: Distribution hypothesis tests by bank size

		Traditional revenue model ρ^*	New revenue model $\bar{\rho}^*$
f(Large) = g(Medium-sized)	T-statistics	8.40595	9.93722
	p value	0.0000	0.0000
f(Large) = g(Small)	T-statistics	2.28904	2.24556
	p value	0.0075	0.0075
f(Medium-sized) = g(Small)	T-statistics	5.52902	5.9401
	p value	0.0025	0.0000

Note: The functions f(·) and g(·) are (kernel) distribution functions for each model being compared.

Source: Prepared by authors

In the last part of our paper, we try to compare the differences between efficiencies calculated using two main models – traditional revenue efficiency (TRE) and new revenue efficiency (NRE) – in the whole sample, in different countries, and different sized groups. Based on the results presented in Tab. 5, we can see that there exist significant differences between efficiencies calculated by NRE and TRE model. The exception is in case of banks in small size group, where the difference is not significant, so we can claim that both models produce comparable results. In other sub-groups, it depends on whether the efficiency is calculated by using the traditional or new revenue model. As we know, a higher value of T-statistics can signify more significant differences between sub-groups. Based on this assumption, we can say that the most significant differences were between efficiencies calculated by NRE and TRE model within the banks located in Slovakia and between banks in medium-sized group. So we can confirm our research hypothesis that it depends on the applied methodology. As we can see that different method bring significantly different results, therefore it is better to use several methods simultaneously instead of a single method and try to find out models which describe the real situation in the best way.

Tab. 5: Distribution hypothesis tests by applied model

		All years
f(NRE) = g(TRE)	T-statistics	1.2449
	p value	0.0150
f(NRE, Slovakia) = g(TRE, Slovakia)	T-statistics	9.8092
	p value	0.0000
f(NRE, Czech Republic) = g(TRE, Czech Republic)	T-statistics	2.2908
	p value	0.0225
f(NRE, Large) = g(TRE, Large)	T-statistics	3.8789
	p value	0.000
f(NRE, Medium-sized) = g(TRE, Medium-sized)	T-statistics	9.4387
	p value	0.0000
f(NRE, Small) = g(TRE, Small)	T-statistics	1.94067
	p value	0.4211

Note: The functions f(·) and g(·) are (kernel) distribution functions for each model being compared.

Source: Prepared by authors

In the end, we want to apply GMM to analyse, if the bank size and location could be considered as variables with a significant impact on bank efficiency. We applied the Chow test and we found out that it was not necessary to work with panel structure; therefore, pooled OLS method was applied. Also, the standard test for OLS was applied. The heteroscedasticity was tested by studentised Breusch-Pagan test and autocorrelation by Durbin-Watson test. The results of the tests can be seen in the following table (Tab. 6).

Tab. 6: Results of GMM analysis

	TRE	NRE
Intercept	0.047545 (0.0555)	0.111233 (0.0446)**
TRE _{t-1}	0.874482 (0.0692)***	
NRE _{t-1}		0.653985 (0.0682)***
DUMMY location	0.016789 (0.0266)	0.090270 (0.0249)***
DUMMY size	0.001691 (0.0178)	-0.004375 (0.0151)
Number of observations	126	126
Multiple R-squared	0.6189	0.6563
Adjusted R-squared	0.6096	0.6478
F-statistic (p-value)	66.06 (0.0000)	77.64 (0.0000)
Breusch-Pagan test (p-value)	1.5877 (0.6622)	21.318 (0.0000)
Durbin-Watson test (p-value)	1.9469 (0.3619)	1.7596 (0.0778)

Note: Indication of significance levels: (*) 0.1 (**) 0.05 (***) 0.01. Standard error in parentheses in the independent variables.

Source: Prepared by authors

The results of the analysis pointed to the fact that in both models, the level of efficiency depends on the level of efficiency in the previous year. We could see that in both cases, the time-shifted variables were statistically significant and positive. It means that the increase in efficiency can be expected in banks, where the level of efficiencies also increased in the previous year. The dummy variables location can be considered as statistically significant only in the case of a new revenue model. We can see a statistically significant positive impact, which signalises, that it depends if the bank is located in Slovakia or in the Czech Republic. According to the coefficient sign we could expect, that with a higher value of dummy variable the efficiency increase. In our model, the higher value of the dummy variable is connected with banks in the Czech Republic. Therefore, we can suppose that Czech banks were able to obtain a higher value of new revenue efficiency. This fact could be connected to the situation on the Czech banking market compared to Slovak ones. In the case of the Czech Republic, the decline in interest rates was not so significant as in the case of Slovakia. It was influenced by the decision of the Czech national bank, who decide did not apply negative interest rates like European central bank which influence the monetary policy in case of Slovakia. Therefore, we can suppose that the decrease in interest income in the case of Czech banks were not so dramatic like in the case of Slovak banks. The last dummy variable size was not statistically significant in both models. Therefore, we can suppose that from the point of view of the regression model, it is not significant if the bank is located within the small, medium-sized or large size group.

5 Conclusion

Using the nonparametric DEA method, this paper empirically estimates the efficiencies of banks in Czech Republic and Slovakia during the period from 2008 to 2017. The original contribution of the paper is an illustrative application of the traditional Farrell (1957) DEA approach as well as a new Tone (2002) approach for evaluating the revenue efficiency of the commercial banks. From the gained results it comes out that, in the case of the traditional approach, which assumes that prices of outputs are exogenously given and also in the case when prices of outputs are added, the transformation of deposits into loans and other earning assets was successfully achieved by the larger ones on the market, and also by bank located in Czech Republic. The average traditional revenue efficiency ranged from 56.64%

to 82.68%, and average new revenue efficiency ranged from 63.11% to 82.41%.

When we look at the results of the traditional revenue model and a new revenue model, we can see a decline in efficiencies during the analysed period. As the reason of decline in revenue efficiency can be considered the decline in interest rates set up by central banks in both countries. This decline was pass-through into the interest rates on the interbank market, and also into the interest rates connected on bank products. Due to the decline in interest rates for loans, banks were not able to generate such a high value of interest income as at the beginning of the analysed period. As we know, the commercial banks try to replace this loss of interest income by decreasing operating expenses or by increasing non-interest income to prevent a decline in their profitability. We could see that the banks were able to increase their non-interest income, but the increase was not so high compared to the decline in interest income. Therefore, we can suppose that this fact had a negative impact on banks revenue efficiencies during the last years of the analyzed period.

In the next part of our paper, we examined whether there exist significant differences in estimated efficiencies. Specially, we focused on four sources of heterogeneity, namely, the type of efficiency considered, the location of the bank and the size of the bank. Based on the results of distribution hypothesis tests, we could confirm our research questions that depended on size, location and applied methodology. As the results of our analysis pointed to the existence of significant differences between banks, we also apply the GMM analysis to determine if the efficiency in the previous year and dummy variables in the form of size and location had a positive or negative impact on the revenue efficiency. The results pointed to the fact that the efficiency in the previous year has a significant and positive impact on efficiency under both models. The statistically significant positive impact in the case of dummy variables was confirmed only in the case of the location under the new revenue model. This fact could be connected to the situation on the Czech banking market compared to Slovak ones, where the decline in interest rates was not so significant like in the case of Slovakia. Therefore, we can suppose that the decrease in interest income in the case of Czech banks were not so dramatic like in the case of Slovak banks. The coefficient was significant only under the new revenue model which also take into account the information about the prices and therefore can better describe the situation on the market.

We are aware that our research has some limitations, therefore in future research, we want to include not only parameters like bank size, and location, but also extend our analysis with another bank variable as well as macroeconomic and regulatory variables.

Literature:

1. Berger, A. N., & Udell, M. (1997). Inside the black box: What explains differences in the efficiencies of financial institutions? *Journal of Banking & Finance*, 21(7), 895–947. [https://doi.org/10.1016/S0378-4266\(97\)00010-1](https://doi.org/10.1016/S0378-4266(97)00010-1).
2. Bogetoft, P., & Otto, L. (2010). *Benchmarking with DEA, SFA, and R*. Springer Science & Business Media.
3. Bogetoft, P., Otto, L., & Otto, M. L. (2018). *Package 'Benchmarking'*.
4. Černohorská, L., Pilyavskyy, A., & Aaronson, W. (2017). *Comparative performance of the Visegrad group banks for the period 2009-2013*. <https://doi.org/10.15240/tul/001/2017-2-013>.
5. Černohorský, J. (2015). Koncentrace a ziskovost na bankovním trhu České republiky. *Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration*, 22(35), 30–41.
6. Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2(6), 429–444. [https://doi.org/10.1016/0377-2217\(78\)90138-8](https://doi.org/10.1016/0377-2217(78)90138-8).

7. Cooper, W. W., Seiford, L. M., & Tone, K. (2007). *Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References and DEA-Solver Software* (2nd ed.). Springer US. <https://www.springer.com/gp/book/9780387452814>.
8. Cupic, M., & Siranova, M. (2018). Banking Sector in the Process of European Integration: How did EU Accession and Euro Adoption affect Cost Efficiency of Slovak Banking Sector? *Ekonomický Časopis*, 66(2), 24.
9. Delis, M. D., Koutsomanoli-Fillipaki, A., Staikouras, C. K., & Katerina, G. (2009). Evaluating cost and profit efficiency: A comparison of parametric and nonparametric methodologies. *Applied Financial Economics*, 19(3), 191–202. <https://doi.org/10.1080/09603100801935370>.
10. Dinh, L. H., Nguyen, N. T., & Vu, L. T. (2019). Measuring banking efficiency in Vietnam: Parametric and nonparametric methods. *Banks and Bank Systems*, 14(1), 55–64. [https://doi.org/10.21511/bbs.14\(1\).2019.06](https://doi.org/10.21511/bbs.14(1).2019.06).
11. Dong, Y., Hamilton, R., & Tippett, M. (2014). Cost efficiency of the Chinese banking sector: A comparison of stochastic frontier analysis and data envelopment analysis. *Economic Modelling*, 36, 298–308. <https://doi.org/10.1016/j.econmod.2013.09.042>.
12. Gavurova, B., Belas, J., Kocisova, K., Dapkus, R., & Bartkute, R. (2017). Revenue and cost efficiency of banking sectors in the European Union countries: Do they depend on size, location or crisis period? *Transformations in Business & Economics*, 16(2), 124–146.
13. Färe, R., Grosskopf, S., & Knox Lovell, C. A. (1985). *The Measurement of Efficiency of Production*. Springer Science+Business Media.
14. Farrell, M. J. (1957). The Measurement of Productive Efficiency. *Journal of the Royal Statistical Society: Series A (General)*, 120(3), 253–281. <https://doi.org/10.2307/2343100>.
15. Ghroubi, M., & Abaoub, E. (2016). A Meta-Frontier Function for the Estimation of Islamic and Conventional Banks' Cost and Revenue Efficiency: The Case of Malaysia from 2006 to 2012. *International Journal of Business and Management*, 11(5), 254. <https://doi.org/10.5539/ijbm.v11n5p254>.
16. Havranek, T., & Irsova, Z. (2013). Determinants of Bank Performance in Transition Countries: A Data Envelopment Analysis. *Transition Studies Review*, 20(1), 1–17. <https://doi.org/10.1007/s11300-013-0270-x>.
17. Irsova, Z. (2009). Measuring bank efficiency. *Charles University in Prague*.
18. Li, Q., Maasoumi, E., & Racine, J. S. (2009). A nonparametric test for equality of distributions with mixed categorical and continuous data. *Journal of Econometrics*, 148(2), 186–200. <https://doi.org/10.1016/j.jeconom.2008.10.007>.
19. Olson, D., & Zoubi, T. A. (2011). Efficiency and bank profitability in MENA countries. *Emerging Markets Review*, 12(2), 94–110. <https://doi.org/10.1016/j.ememar.2011.02.003>.
20. Palečková, I. (2019). Cost Efficiency Measurement Using Two-Stage Data Envelopment Analysis in the Czech and Slovak Banking Sectors. *Acta Oeconomica*, 69(3). <https://doi.org/10.1556/032.2019.69.3.6>.
21. Pancurova, D., & Lyócsa, Š. (2013). Determinants of Commercial Banks' Efficiency: Evidence from 11 CEE Countries. *Finance a Úvěr-Czech Journal of Economics and Finance*, 63(2), 152–179.
22. Phang, S., & Raweevan, M. (2018). A Study of Cost, Revenue, and Profit Efficiency of Commercial Banks in Cambodia Using DEA Approach. In T. Theeramunkong, A. M. J. Skulimowski, T. Yuizono, & S. Kunifuji (Eds.), *Recent Advances and Future Prospects in Knowledge, Information and Creativity Support Systems* (pp. 168–178). Springer International Publishing.
23. Prior Jiménez, D., Tortosa-Ausina, E., García-Alcober, M. P., & Illueca Muñoz, M. (2016). *Cost and revenue efficiency in Spanish banking: What distributions show*. <http://repositori.uji.es/xmlui/handle/10234/164531>.
24. Racine, J. S. (2012). *Entropy-Based Inference using R and the np Package: A Primer* (https://cran.r-project.org/web/packages/np/vignettes/entropy_np.pdf).
25. Ray, S. C., & Das, A. (2010). Distribution of cost and profit efficiency: Evidence from Indian banking. *European Journal of*

Operational Research, 201(1), 297–307. <https://doi.org/10.1016/j.ejor.2009.02.030>.

26. Rossi, S. P. S., Schwaiger, M., & Winkler, G. (2005). *Managerial Behavior and Cost/Profit Efficiency in the Banking Sectors of Central and Eastern European Countries* (No. 96; Working Papers). Oesterreichische Nationalbank (Austrian Central Bank). <https://ideas.repec.org/p/onb/oenbwp/96.html>

27. Ruinan, L. (2019). Comparison of Bank Efficiencies Between the U.S. and Canada: Evidence Based on SFA and DEA. *Journal of Competitiveness*, 11(2), 113–129. <https://doi.org/10.7441/joc.2019.02.08>.

28. Sealey Jr, C. W., & Lindley, J. T. (1977). Inputs, outputs, and a theory of production and cost at depository financial institutions. *The Journal of Finance*, 32(4), 1251–1266.

29. Siranova, M., & Cupic, M. (2015). Efficiency of Slovak Banking Sector Before and after the EU Accession b. *Proceedings of the International Scientific Conference Contemporary Issues in Economics*, 521–535. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2625919.

30. Tan, Y. (2016). *Efficiency and Competition in Chinese Banking*. Chandos Publishing.

31. Tone, K. (2002). A strange case of the cost and allocative efficiencies in DEA. *Journal of the Operational Research Society*, 53(11), 1225–1231. <https://doi.org/10.1057/palgrave.jors.2601438>.

Primary Paper Section: A

Secondary Paper Section: AH, BB

EDUCATIONAL CONSTRUCT OF NATURAL AND SOCIAL REALIA IN 2ND GRADE OF ELEMENTARY SCHOOL WITH AN EMPHASIS ON ENVIRONMENTAL EDUCATION: A COMPARISON OF THE SLOVAK AND CZECH MODEL

^aDANA KOLLÁROVÁ, ^bEVA HEGAROVÁ, ^cALEXANDRA NAGYOVÁ

Constantine the Philosopher University in Nitra, Department of Pedagogy, Dražovská cesta 4, 949 74 Nitra, Slovakia
 email: ^adkollarova@ukf.sk,
^beva.hegarova@ukf.sk, ^calexandra.nagyova@ukf.sk

This study was supported by the Slovak Research and Development Agency under the contract No. APVV 18-0484 as a part of the research Forest Pedagogy and Education to Sustainable Development in pre-primary and primary education.

Abstract: Natural and social realia are in the 2nd grade of elementary schools being taught primarily as a part of the Elementary realia subject. This subject, not only in Slovakia but also in the Czech Republic, has in the last decade undergone several content changes. This research paper shows comparison of educational content of the Elementary realia subject in the two above mentioned countries, which had originally identical content. The authors conducted a research, in which they focused on comparing the current contents of the Elementary realia by utilizing in-depth analysis. In presented research paper, they present partial results of the research with an emphasis on topics, that can enhance pupils' knowledge of forest environment. The core of teaching Elementary realia is the conceptual process. The concepts were discovered by the analysis, and these were related to the topics, which pupils are expected to adopt and understand. Authors were able to convert these concepts from theory into application, more specifically into the education construct, which essentially supports the educational contents of Elementary realia via aesthetic-educational objects. This represents a strategy, of how to stimulate pupils' relationship to the environment and their environmentally responsible behavior, as a part of sustainable development education.

Keywords: Elementary realia subject, conceptual process, integration of contents, aesthetic-educational objects.

Introduction

As a child enters elementary school, a new life chapter of a child begins. This new role of a pupil brings new impulses, which not only stimulate pupils' observation skills, but also make a pupil compare, evaluate, think, experience, and engage imagination. These are necessary cognitive constructs in order to development pupil's active vocabulary. Along with the trivia subjects on elementary schools, the subject of Elementary realia is in the 1st and 2nd grade of elementary school one of the vital subjects, which develop pupil's cognitive functions. A teacher must organize all stimuli and their definitions, that have pupil experienced in social or natural environment, into a meaningful system. For this reason, in the Elementary realia education process the conceptual process is crucial. This is because pupils learn this subject by observation, which subsequently leads to defining the objects and phenomena. They learn to find linkages and mutual relations. This approach helps pupils to create initial understanding of the world as a whole and by targeted activities, pupils are led to responsible behavior in both, natural and social environment.

The Elementary realia teaching content has undergone various changes after the split of Czechoslovakia. These changes, according to teachers and experts (Nagyová, Kollarová, 2021), have not always led to improved quality of the original content. In both countries, only little emphasis, from educational as well as research perspective, is put on teaching Elementary realia, and its curriculum is not properly established. This is supported by the fact that in Slovakia, there is no Elementary realia textbook for 2nd grade of elementary school with an approval clause, only the one with recommendation clause. For this reason, the research paper focuses on content analysis of Elementary realia textbooks and education standards in these two countries, which are essentially rooted in the one same curriculum. The results of the conducted research, which may lead to partial innovation of the Elementary realia curriculum in Slovakia with focus on a balance between natural and social sciences components. In the presented study, we focus on presenting partial results, in which we would like to emphasize the fact, that pupil's social competencies must be stressed even in topics of natural science.

Via natural science topics we can lead students not only to the understanding of elementary realia and their relations, but also to a perception of beauty of natural environment and mutual importance among forest environment and humans, mainly for their well-being. We understand that the aesthetic categories should play crucial role in pupil's experience of environment, in order to activate pupil's experiencing and imagination and subsequently the cognitive thinking and speech. For this reason, by the end of this research paper, we focus on topics of targeted aesthetic-educational activities. Presented themes come from findings of the terms related to the contents. By these terms, we can engage a pupil in learning about forest - the observing and learning about forest environment in a way, in which pupils can better understand, experience, and apply their own imagination. In this educational construct, which is based on integration of various teaching subjects, more specifically aesthetic-educational subjects, we see the potential for effective education. By these aesthetic-educational activities, we can not only lead the pupils to identify aesthetics, but also to be able to protect the beauty and to create it.

1 The school subject of Elementary realia as part of learning about oneself

In both, Slovakia and the Czech Republic, this subject is taught under the name "Prvouka" (Elementary realia). In the past, until 1976, the curriculum content of this subject was taught in schools in the 1st and 2nd grade of elementary schools under the name of *Substantive Learning*. After 1976, its name has not changed, although there was a three-year attempt to change this name to Natural Science in the Slovak Republic, but in 2015, it was renamed again to Elementary realia. However, the content of natural science topics remained in the majority, it is up to 82.20%. Even though the original name has been reverted to in Slovak schools, the subject has remained part of the educational area of *Man and Nature*. However, it must be said that some topics are extended into the educational area of *Man and Society*, *Man and the World of Work*. In the Czech Republic, the subject of Elementary realia is a part of the educational area *Man and his World*. The authors consider it to be a correct theoretical starting point that the subject, which is based on the above-mentioned educational area, prepares the foundations for the educational area *Health Education*. In fact, Elementary realia is not only about learning about the natural environment, but it is also important for the pupil to know and understand the social context. This has also been emphasized by Doušková (2003), Kopáčová (2011), who attribute an important educational function to it. They justify this by the fact that it is by interacting with pupils that we develop their personal and social competences and cultivate their thinking and speech.

Through the content of this subject, pupils are taught to perceive nature, and therefore also man as a part of it, and naturally also the relationships between people. They are taught to notice the essential features of observed phenomena, but also the beauty of natural or human creations, so that they can perceive, observe, understand, and think about them in relation to man today and in the future. In Slovakia, the strategy of teaching by means of exploratory and research methods in all thematic units - *Plants*, *Animals*, *Man*, *Inanimate Nature*, *Society* - is being put at the forefront of this curriculum. The research conducted by Klusák (2002, 2010), Čábalová, Podroužek (2013) pointed out that the content must be balanced, because even then, science topics were predominant. In the Czech Republic, the authors of school legislative documents have managed to do this, in Slovak conditions, unfortunately, the social dimension in the teaching of this subject is rather in the background.

In the subject of Elementary realia, the authors would recommend starting with self-knowledge as a priority. Here it is assumed that if the pupils become aware of themselves - their

needs, their conditions, requirements or interests, only in this way will they be able to understand others and their problems and, gradually, also the environment in which they live. The content of education in the Czech Republic is closer to social studies. It consists of the following areas - *The place where I live, People around us, People and time, Diversity of nature, Man and health*. All thematic units include a natural and social science dimension with an emphasis on the direct social experience of the pupil. It needs to be appreciated that the concepts of tolerance, help, solidarity, rights, and duties are used. It is also positive to note that the topics linked to the *People and time* unit are based on the family, on family events, and gradually, by means of a spiral system of outlining, we move to events in the municipality, the region, and the country. If the teacher leads the pupil by such a strategy from familiarization and orientation in himself and in his immediate environment, it should not then be difficult to lead him to familiarization with the diversity of nature, which he will learn to see as an essential part of his life.

The authors' intention in the presented study is to operate with themes from the natural science domain - themes in which the pupils are taught about the forest. Through these themes and the concepts that relate to each lesson, the authors want to show how they can transfer the themes and the concepts to social contexts. The authors want to emphasize experience and experiencing in their teaching strategy. The authors would like to emphasize that through the content of Elementary realia the pupil's value system should also be shaped. The teacher, through his/her teaching strategy, his/her behavior and actions, teaches the pupils to look for ways in which they themselves can help and improve the environment. The focus in these environments, both natural and social, is the pupil and his safety, health, and his security to function in these environments.

1.1 Cross-cutting topics and integration of contents in the subject of Elementary realia

Elementary realia is a subject that creates a large space for integrating contents. It can be implemented through cross-cutting topics, through organizational forms or methods that are used in other subjects.

In both education programs (Slovak and Czech) there are cross-cutting topics - *Personal-Social Education, Environmental Education, Media Education*. It should be noted here that the Czech curriculum is also supported by such cross-cutting topics as *Education of the Democratic Citizen* and *Education for Thinking in European and Global Contexts* (www.nuv.cz, 2021, p. 132-144). The authors consider these topics important in the light of the current socio-cultural conditions that people are confronted with on a daily basis, which require engaged and critical thinking on the part of the pupil. The authors dare to say that such a grasp of the subject of Elementary realia curriculum is absent in Slovakia. In the Slovak model of education, in addition to the common topics mentioned above, the curriculum also focuses on cross-cutting topics - *Multicultural Education, Traffic Education - Road Safety Education, Protection of Life and Health, Regional Education and Traditional Folk Culture, Project Creation and Presentation Skills*.

The topics in the subject of Elementary realia which are related to the forest environment are closest to environmental education. Like the other cross-cutting topics, environmental education reflects contemporary human issues. It should be stressed that cross-cutting topics are a compulsory part of education, and it is up to the teacher's teaching strategy to decide through which organizational forms, methods, or didactic means to implement it. In accordance with the *State Educational Program* (2015), environmental education leads pupils to a comprehensive understanding of the interrelationships between humans and the environment. The aim of applying this cross-cutting topic is also that the pupil at elementary school:

- learns the basic rules and skills for behavior in nature with respect to organisms and their environment;

- takes an active part in improving the environment of the school and its surroundings;
- behaves respectfully towards natural resources.

Cross-cutting topics, as stated in the *State Educational Program* (2015) in the Slovak Republic or the *Framework Educational Program* (2021) in the Czech Republic, can be implemented in several forms. One possibility is as an integrated part of the content of education through appropriate school subjects. The educational program in the conditions of the Slovak republic emphasizes that a necessary condition for effectiveness is the use of activating teaching methods. Aesthetic-educational activities can be included among them.

The teacher should be able to appropriately vary the use of different methods. The right choice of methods and their modification and alternation not only guarantees the interestingness of the teaching process, but also creates conditions for a variety of learning strategies. Maňák and Švec (2003, p. 49) set the criterion for the division of teaching methods as the increasing complexity of educational links. Accordingly, they divide them into methods considering *pupil participation, activating* and *complex methods*. It is the *complex methods* that expand the possibilities of teaching methods by elements of organizational forms, didactic means. These include discussion, heuristic, staging, situational and didactic games. The authors also include pupils' independent work or teaching by dramatization in this group of methods. Thus, aesthetic-educational activities can also be included here. The authors list some specific and proven methods that can be used to develop and consolidate knowledge about the forest, while at the same time forming a relationship with the forest and protecting it.

Every teaching method should be seen as part of the educational process. Individual teaching methods can be combined, varied, and creatively adapted to the given conditions. There is neither a good nor a bad teaching method. Its effectiveness depends on many factors, but the decisive element is the methodological mastery of the teacher himself/herself.

1.2 Terms systematization of the subject Elementary Realia in curriculum about forests

The research focused on the educational content of the subject Elementary Realia. Reasons for the research were the often changes in the content of the subject Elementary Realia or its name in Slovakia, which did not bring quality to it, that was eventually also confirmed by our research. Conducted research (Nagyová, Kollárová, 2021) mapped the opinion of teachers and professionals, who are also dedicated to the educational content. The subject of Elementary Realia can be considered as another key subject in the educational trivia subjects. It is characterized by the linear plotting system. In other words, one can go about the curriculums for one hour and there is no space for repetition. For these reasons, by analyzing the educational programs and textbooks, the objective was to find out which terms are connected to individual curriculums, so that in the application field it can be clarified, how can these curriculums be supported with other educational subjects. For the need of these studies, the aesthetic-education subjects were chosen, more specifically aesthetic-educational activities.

Solution to our project *Forest pedagogy in the preprimary and primary education and the raising to a consistent kept growth*, which is a part of these studies, we focused on contents related to the forest environment. By means of aesthetic-educational activities, bases of which are emotions, we want to illustrate, how to teach pupils about forest. We suggest this presented educational construct also for the reason, that the studies conducted by Tóthová (2014), Žoldošová (2006) showed, that teacher in the 1st grade of elementary schools apply the traditional transmissive form of education on a large scale.

For the subject Elementary Realia which is a conceptual process, teachers should have a systematization of terms to each individual subject. In the past it was a part of the methodical

guidelines. In the present, teachers do not have terms for the subjects. By analyzing the educational standards in Slovak and Czech educational program and textbooks, the terms were summarized, and a file of these terms was created for the curriculums. Until 2008 school reform, it was common to work with workbooks and methodic guides, where teachers had an exact schedule of terms, with which they can describe the educational content. If we want to attempt to develop the pupil's relationship to the nature, particularly forest environment, we should know the contents potential and the terms related to it. Via these terms, the pupil's knowledge system can evolve, and pupil's awareness about the importance of forest environment for human as well as human for the forest environment, is formed. That is why our goal was to find out, which terms should a pupil acquire in the educational process of the subject Elementary Realia in the 2nd year. We analyzed seven textbooks of the subject Elementary Realia for the 2nd year, four of them were Slovak and three were Czech textbooks. From the Czech textbooks in our research, we present the results from only one textbook. This decision was made because this textbook acquired a European price for its quality. As stated at the beginning, the reason this research file was chosen, is that these countries come from a collective content foundation and its differences started to occur before the school reform in 2008. As mentioned earlier, in the Slovak educational contents of the subject Elementary Realia, the natural-scientific topics are prevailing. For this reason, it needs to be determined, which educational topics and their content from Czech educational programs could serve as an inspiration to update Slovak educational content.

In this study, only partial results of the research are presented, in which the answer is provided for the question - *Which terms in the subject of Elementary Realia in the 2nd year represent the topics related to the environmental education?* When evaluating the qualitative content analysis of the text, while the texts were the textbooks and educational standards from both countries, we selected the method of encoding the text through analytical units – categories, so with the open text encoding we found relations between created categories. In the following tables we present the terms, which relate to the learning about forest and a pupil of the 2nd year should acquire them, understand them and know how to apply them in context.

Table 1: Terms for the educational content of the subject Elementary Realia in Slovakia

TF	Curriculum	Terms
Plants	<i>Plant environment</i>	By the water, in the water, on the rock, in the forest, pine, spruce, mold, water lilly, blackberry, mountain, rock rose, bulrush, willow
	<i>Adapting to the environment</i>	Plant shape, root, root length, drought, moisture, heat, cold, light, shadow, leaf thickness
	<i>Life manifestations of plants</i>	Water intake, growth, development, respiration, reproduction, nutrient intake, cuttings, alarms, movement
	<i>Seed spreading</i>	Mother plant, seeds, spread by water, wind, animals, spread separately, fruit, hook, berry cone, spines parachutes
	<i>Seed germination</i>	Germination, germ, seedlings, sprout, decomposition of seeds, seeds, stem base, root base
Animals	<i>Plant living conditions</i>	Water, soil, air, heat and sunlight, wilting
	<i>Plant as a food</i>	Useful plant
	<i>Life manifestations of animals</i>	Growth, respiration, food intake, water intake, reproduction, movement, development

Lifeless nature	<i>Animal community</i>	Couple, family, beehive, colony, herd clamp, fock social insect,
	<i>Bee community</i>	Mother, worker, trunks, swarm, tree caity, combs, hive, honey, royal jelly, propolis, beeswax, bee venom, pollen, laying eggs, beekeeper, bee product, beehive, queen, sting, larva, honeycomb, nectar, wedding bee dance, soldiers
	<i>Ant community</i>	Queen, anthill with corridors, chamber, winged female, winged male, northside, corridors, worker, odor trail
	<i>Lifespan</i>	Young, adult, individual, height, weight, color, body surface, body parts, dexterity, age, growth, development, adolescence, aging
	<i>Animals as food</i>	Utility, breeding, hunting
	<i>Components of inanimate nature</i>	Soil, water, air
	<i>Soil</i>	Layer, earth's surface, living, inanimate and dead soil components, water, air, pebbles, sand, clay, dirt, fertility – water intake, retain water, permeability, color, stickiness, water content, soil pollution, roots, mole, earthworm, ant, caterpillar, settling, scent
	<i>Elements of the landscape</i>	Landscape, mountains, fields, meadows, forests, orchards, plain, lakes, hills, rivers, damns, human creations, houses, roads, buildings, naturals

The stated terms for the curriculum come from the comparison of all current textbooks of the subject Elementary Realia for the 2nd grade of elementary schools, because for the 2nd grade, we do not have a textbook that would have an approval clause, only a recommendation clause. In the following table we will present the curriculum and its terms that are based on the Czech textbook. Here we decided to analyze the textbook by Dvořáková and Stará (2008). We did so, because this textbook won the first place in the Best European Schoolbook Awards (BESA) competition in 2011.

Table 2: Terms for the educational content of the subject Elementary Realia in the Czech Republic

TF	Curriculum	Terms
Autumn in te	<i>Autumn in nature</i>	Deciduous and coniferous forest, trees – maple, oak, beech, birch, spruce, pine, fir, larch, mushrooms edible, inedible, poisonous, deciduous trees – oak, maple, birch, linden, horse chestnut, rowan
	<i>Trees and bushes</i>	Woody plants, leaves, crown, fruits, branches, trunk, roots, shrub, tree, above and below ground part
	<i>Animals in autumn A walk in nature</i>	Wildlife – bear, fox, squirrel, pig, birds
	<i>Autumn in the forest</i>	Tree, parts of the tree – crown, trunk, branches, leaves, roots, fruits, flowers
	<i>Winter in nature</i>	Winter months (December, January, February), winter

		solstice, animal feeding, feeder, animal tracks Animals in winter, the way of wintering, moving to warm landscapes, animal care, feeder, hunter, animal tracks, hibernation, partridge, tit, hare, roe deer, deer, fox, pheasant, crow, raven, sparrow, blackbird
Spring	<i>Spring in nature</i>	Melting, frosting, sprouting, flowers, pollination, animal reproduction, sowing grain, planting, April
	<i>Herbs</i>	Ornamental plants, agricultural crops, poisonous and medicinal herbs, protected, carnivorous, underground part – rhizome, onion, leaves, stem, flower
	<i>Animals</i>	Mammals, birds, zoo animals, male, female, cub
	<i>The body and life of animals</i>	Mammal (head, neck, torso, front and back limbs, tail), suckling milk, fur, bird (head, neck, torso, wings, limbs, tail), feathers, eggs, fish (head, body, fins) gills, skin with scales
Summer	<i>Animals in the zoo</i>	Wildlife, cage, terrarium, aviary, paddock, aquarium
	<i>Nature around us</i>	Protected area and behavior in it, nature protection, national park
	<i>The meadow</i>	Beetles, butterflies, small animals (fox, snail, wild boar, owl, bee, deer, hedgehog, lizard, hare, earthworm, cuckoo), plants (poppy, bell flower, nettle, chamomile, Daisy, blueberry, moss, lily of the valley, strawberry)
	<i>Waters</i>	Raindrop, drinking water, polluted water, stagnant water (pond, sea), running water (river, stream)
	<i>Lifeless nature</i>	Inanimate nature (soil, rocks, water, air), Soil (living and inanimate nature, water cycle)
	<i>Soil</i>	Remains of plants and animal bodies, soil, fertilization, loosening
	<i>Air</i>	Air/oxygen, plants with green leaves

In the Czech program, we positively evaluate the inclusion within the topic *Our family* such curriculums, in which *the duties of family members* or *the choice of profession* are emphasized. In connection with the forest, we consider this to be inspiring because, after every-day duties, the family also needs to spend time and rest together, which can be also applied for a forest tourism. When choosing a profession, we do not encounter the profession of *forester* in any textbook. We neither have a *career choice* topic in the curriculum of the subject of Elementary Realia in the Slovak educational program. It also needs to be reminded that the topic *We want to be healthy*, is again included in the Czech program curriculum. Here, too, can be found overlaps with the curriculum about *family* – the mentioned family tourism, specifically clothing in the forest, possible injuries in the forest, or the dangers of inappropriate behavior in the forest (scaring animals, picking and eating unknown berries), but also observing the cleanliness of the forest, or perception of black dumps. In the Czech Republic, they follow the seasons and pupils gain knowledge about the forest through the plant and animal kingdoms. It should be reminded that they also pay more attention to protected areas, which is absent in Slovak textbooks.

We already mentioned that in Slovak education system conditions, there is rather an emphasis on research activities. To a lesser extent, we also see them in Czech textbooks, however they are more focused on experiments, such as removing impurities from water, so that pupils understand where we get water from and what is the process of water treatment until it comes from natural source to human, and subsequently back to the nature. But they are also learning about the lack of water and about helping others. This way, pupils can be led to the sense of companionship and become aware of this rare resource. We find it helpful that in this textbook each topic is structured in a meaningful arc starting from the nature itself through the human and its role in the nature, to another form of human intervention in nature. This not only educates pupils about the surrounding environment, but through specific activities they can realize its importance as well as learn how to develop a relationship with the natural environment. There is a fundamental difference because, this element is absent in the Slovak textbooks. In Slovakia, the focus is more on the knowledge system with an emphasis on research aspects of teaching. Researching, creating, and verifying assumptions undoubtedly develops pupils' personality and provides them with experience, but forgets the global context. The pupil should realize that it is part of this process that the researched objects or reality are closely related to him/her, his/her classmates, family.

2 Teaching strategies in Prvouka and its interdisciplinary approach

In the previous section, we mentioned that the teaching of the First Classes is a conceptual process. With his individual teaching concept, the teacher should include such tasks and targeted educational activities that stimulate the cognitive activity of the pupil. One of the strategies for approaching students' understanding of concepts in order to know their connection with reality is to support the curriculum through aesthetic-educational activities. These activities are accompanied by the experience and expression of the pupil's ideas. Imagination is a cognitive process, and it is through the expression of the pupil's ideas - movement, sound, color, line that the teacher can find out how the pupil thinks.

By integrating aesthetic-educational activities into the teaching of „Prvouka“, specifically in topics about the forest, we can not only verify the pupil's knowledge, but we can also use them to stimulate his interest in the forest environment. We do this by reading or singing about nature together, observing trees, animals, their singing or coloring their bodies. In the past, „Prvouka“ was part of the subject *Mother Tongue*, specifically it was supported by literary texts and also by the subject *Teaching through work* by means of work with natural material. Both subjects are close to aesthetic-educational activities.

The application of interdisciplinary relationships in the educational process helps to eliminate the pupils understanding of knowledge as a subject of isolated facts. Průcha, Walterová and Mareš (2009) characterize interdisciplinary relationships as reciprocal connections between individual subjects, which represent a broader subject framework. Ficová et al. (2013) refer to the interdisciplinary approach as a didactic principle. Lenoir, Hasni (2016), Vass and Perjes (2009) also talk about interdisciplinary relationships not as a goal, but as a way of education. Velmovská (2012) points out that these are links that are based on the content matches of the curriculum of individual subjects, content links, method links, or time links. The authors agree that these links contribute to the effectiveness of education. Here we would like to mention the research Denem and Ada (2012), the results of which confirmed that such an educational approach has a positive effect on the pupils learning with an emphasis on the application of knowledge in real life. That integration can be in a narrower or broader way. In our case, it is a narrower way. These are subjects that are different in content. This also includes aesthetic and educational subjects - music education, literary education.

Our latest research, Nagyová, Kollárová (2021), showed that teachers in primary education consider it necessary to use interdisciplinary relationships in „Prvouka“. This opinion is held by up to 81.75% of 126 teachers. They find it so important, because they see the interconnectedness of knowledge in it and its application in real life, and they also justify it by the fact that the subject „Prvouka“ has a low time allowance. They most often use literary texts; it is up to 94.90% of teachers. If we asked about the connection with aesthetic-educational subjects, art and music education were most often represented, followed by ethical education.

3 Aesthetic education in Prvouka

Aesthetic education can be considered a pedagogical approach in which we focus on highlighting the beauty all around us. The natural environment, especially the forest environment, is no exception. That we can discover unique creations of nature in the forest. Many trees are original works of art. The sight and perception of such peculiar natural phenomena are connected with experience, with emotions, but also with imagination, memory and thinking. These perceptions, which are part of cognitive processes, stimulate the pupil not only to seek beauty, but also to be able to protect and complete beauty.

Mistrík (2007) considers aesthetic education as a pedagogical and deliberate influence on aesthetic value orientation as well. Such an educational effect is important in order for students to be able to value and appreciate aesthetic values, including the relationship of a man to objects and phenomena that he creates through aesthetic experience. Through aesthetic education, we also develop the ability to evaluate the surrounding reality and stimulate critical attitudes. It is this ability that is necessary in the perception and evaluation of the surrounding reality, including the natural environment. With the above stimuli, we can lay the foundations of both aesthetic and environmental education in the pupil. Both disciplines have a pedagogical dimension. It is education, as a part of pedagogy, that helps them to find suitable methods and means of educational work.

Činčera (2007) mentions that the philosophy of environmental education is based on environmental ethics. For this reason, we should address the topic of the human's need for nature, perception of beauty of natural phenomena with pupils in several educational areas, but also talk about human interventions in natural environment, or the need to protect the environment for ourselves and future generations. We agree with Kelcova (2015) that understanding is a basic condition for a pupil's active approach. We will emphasize only two important goals of environmental education, which the author states:

- communicate with students about the state of the environment, strengthen their sense of responsibility and the protection of all living things,
- lead them to a healthy lifestyle and perception of the aesthetic qualities of the environment, lead them to a perception and sensitive approach to natural and cultural heritage (www.statpedu.sk, 2015).

As mentioned in the introduction, in this research paper we narrow the natural environment to the forest environment. We dare to say that just by discovering the beauties of the forest environment, through its colors, sounds, shadows, movement, unexpected natural still lives of the plant or animal kingdom, we can also discover natural and artistic means in the forest environment with pupils. These can become the basis for the expressive level of aesthetic activities in education. At the receptive level, we can stimulate pupils with illustrative teaching aids. They can be fairy tales with a forest theme or poems, illustrations, photographs, or recordings of animal sounds that depict the environment of the forest.

Our accredited Forest Learning program for teachers as part of their in-service training shows that if we provide pupils with life in the forest through artistic means, then they perceive the specific stimuli more sensitively, once they enter the real forest

environment. Here it can be assumed that the pupils will form a relationship with the forest and want to return to it and get to know it better. With its spaciousness, the forest provides many opportunities for its perception, getting to know each other, as well as for building mutual relationships and attitudes, but also for developing the pupil's motor skills. The topics, in which we teach pupils about the forest environment – *in wildlife, deciduous and coniferous trees, animals in winter, anthill, the shape of the landscape, water in the landscape*, must be based on the idea that the forest is one of the most valuable assets that humanity has, also for its self-renewable capabilities. In addition to trees, which are characteristic for the forest and are perceived positively by humans, in learning about forest, we also work with pupils on the importance of the forest for air, water and soil.

The forest therefore also brings aesthetic stimuli. Čaboun et al. (2011) reminds that the forest also has specific psycho-aesthetic effects on humans, created by a combination of light and shadow, colors, shapes, scents, microclimate, sounds, etc. The feeling of peace, silence and the impression of loneliness is significant. On the contrary, factors such as excessive noise, electromagnetic smog, fast pace of life, or lack of exercise on the fresh air leads to an increase in modern diseases among humans. From practice we can confirm that pupils feel relaxed after visiting the forest. Therefore, we involve as many senses as possible in learning and build on the principle of learning through our own experience. We do not only provide pupils with knowledge, but we also develop the psychomotor and socio-emotional side of their personality. In the topics of the forest environment, we lead pupils to understanding of the importance of protecting forests for humans, not from humans.

3.1 Forming the child's relationship to the forest environment through aesthetic-educational activities

Learning about the forest extends its content to the educational field of Arts and Culture. Just as a child performs his observed real-world situations in his thematic games, he is interested in completing his immediate surroundings with various substitute objects. By perceiving the natural unique phenomena in the forest (coloring of tree leaves, singing of birds, flight of animals, structure or color of the bark of the tree), these are all stimuli for aesthetic games in teaching process. Pupils can express themselves by lines, tones, or movement (flight of bees, tree needles), colors (colorful still lifes of trees, or animal fur), graphics (make a stamp from natural material, or wax bark prints). We can transfer these natural themes with the pupils to such activities as designs of patterns for fabrics, or we can decorate clothes (earrings, necklaces, brooches) or the interior with them. Examples are dance and movement activities, in which students create the wind, or let the leaves fall, or a wedding dance of bees. Motivation for dance variations can also be through fairy-tale themes - *the dance of forest fairies, imitated walking of forest animals*. You can add dramatic expressions to your dance or movements to develop your ability to be effective. Knowing that ability is important, for example, for responsible environmental action. Every aesthetic-educational activity significantly contributes to the emotional development of the student.

Through art, i.e., also through aesthetic games, the pupil sensitively learns about the world around him/her. These are often fairy tales whose story takes place in a forest environment. The student must find out that through various activities, which are also with natural materials, the pupil can discover the secrets and beauties of the forest. Every creative adventure can bring him joy and a positive powerful experience. For example, we can also draw the leaves of trees with the pupils on the wax table and compare or sort them according to their shape. The color or structure of the bark can be also interesting for color display. For example, there is a plane tree that sheds bark of various shapes. His bark can become our basic motive in the artistic completion of aesthetic work. The fur of animals or the color of birds' feathers, or their singing, is also inspiring. For example, a woodpecker can type (spell out) a verse. Tree flowers can also be an inspiration. We can make animals from beech trees with

pupils. We can also play circular music-movement games (Miracle Wheel) to convey to students how a tree grows and increases its trunk circumference. A sawn tree can serve as a motive for artistic activities.

When perceiving forest trees, we can find out that some trees have cavities in the trunk. Each has a different shape. By drawing or modeling, pupils can complete what it could be. They can take pictures and talk in a group, which develops students' imagination and the ability to present their opinion in front of the group. Some trees have exposed roots. It is a beautiful inspirational element for the development of not only motor skills and overcoming natural obstacles, but also fantasies for expressing artistic ideas. However, pupils need to be told that root wounds are dangerous to the tree.

In the spring, animal families can be seen in the forest. These can be a subject for artistic, literary or musical activities, but also for movement expression when cultivating movement - an adult and a young, or motivated walking, such as sneaking in the woods, so as not to scare the animal family. Trees or forest animals can be the subject of literary games - various rhetoric, reproaches, riddles. They can contain a natural theme - willow, poplar, birch, fox, wolf, etc. Even static activities focused on attention and perception can be inspiring - standing like an observed tree (directly, crookedly).

As mentioned earlier, literary-drama or musical-drama activities are attractive for pupils. They can play a dialogue between a wolf and a hunter, a wolf with a fox, or with a bear, or with a snake. Many chicks, such as birds, are blind. In dramatic activities, we use blind exercises to build trust in the group. Through movement exercises or pantomime, pupils can also express butterflies of the family, beetles, flies, while the movement is accompanied by a sound expression. Bird singing is more of an inspiration for music education, because birds emit tones, often in rhythmic sections. They are attentive and sing when they feel another bird's singing pause. Some trilling of birds is excellent as a voice warm-up, also tongue twisters.

Through all these activities, we can bring life and attractions in the forest closer to children through an aesthetic game. In order to be curious, but especially perceptive, and to be able to realize through these activities that we can find many beautiful color, sound and movement stimuli in the forest, which we can perceive intensely by perception and observation and progress through the forest through these means and want to understand it. The core should be the accentuated beauty of nature.

4 Conclusion

We should look for and find ways in which we can lead pupils to a responsible, humane and rational approach to the natural environment. One of such strategies is the opportunity to get to know and form a relationship with the natural environment, i.e. the forest environment through aesthetic and educational activities. We can protect the forest only if we understand its value to humans. It is a continuous process by which we reveal to pupils not only the beauty and values of the living, but also current and future environmental problems. Our task is to show them how can we improve these relationships not only with nature but also with people.

In both educational contents of the subject „Prvouka“, in Czech and Slovak, we can find topics related to a man - to his family, to society, to nature, to culture, or to health. The differences are shown in the proportion of these topics in curricula, but mainly by the approach to these topics. In the Czech program, the topics are approached not only from the current perspective, but they capture the historical point of view in an appropriate way, which we find beneficial. Similarly, in the curricula of nature they do not only remain with knowledge, but they emphasize the social dimension for practical life. These are the attributes that absent in the Slovak content of „Prvouka“ education. Also for this reason, we wanted to clarify how we can lead students to discover and get to know the forest environment through science

topics. Pupils can perceive it as part of their lives - physical and mental health. Through aesthetic-educational activities, we can not only develop pupils' emotions, but these are also the basis for thinking and speech abilities. By these activities, we can also lead students to aesthetics, but also to think about the need to protect all living things, and thus be more sensitive in perception.

The pupil's curiosity to learn about the closest environment as much as possible depends on the stimuli of the family surrounding. In addition to the family environment, the teacher's personality and his individual educational concept also plays a significant role here. It is quite probable that a teacher who has the respect and feels responsibility for the protection of the environment will, by this approach, instill these values in children. This can be done not by explanation of facts, but rather by one's own role model behavior and by experiential teaching.

Literature:

1. Čabalová, D., Podroužek, L. 2013. Špecifika prírodovedného vzdelávania v primárni škole se zretelem k projektové kooperativní výuce. In *Arnica* [online]. vol. 3, no. 1-2, p. 1-8. [cit. 2018-11-29]. Available online: <<https://www.arnica.zcu.cz/images/casopis/2013/clanky/1clanekARNICA2013.pdf>>. ISSN 1804-8366.
2. Čaboun, V. et al. 2011. *Lesy pre ľudí*. Zvolen: NLC, 2011. 47 p. ISBN 978-80-8093-063-9.
3. Čincera, J. 2007. *Environmentální výchova: od cílů k prostředkům*. Brno: Paido, 2007. 116 p. ISBN 978-80-7315-147-8.
4. Deneme, S. - Ada, S. 2012. On applying the interdisciplinary approach in primary school. In *Procedia – Social and Behavioral Sciences*. [online]. vol. 46, [cit. 2019-08-16]. Available online: <<https://reader.elsevier.com/reader/sd/pii/S1877042812013468?token=9EA3EC5372403DD46EE3D6DF1E08CCD4D3A6924C4A33FFD6C9E4972A9D6DFD30C97BFDCD4C747D0A34FF6B56C20BAC0E>>. ISSN 1877-0428.
5. Doušková, A. 2003. *Učenie sa žiaka v prírodovednom a spoločenskom kontexte*. Banská Bystrica: PF UMB, 2003. 144 p. ISBN 978-80-8055-807-8.
6. Dvořáková, M. – Stará, J. 2008. *Prvouka 2*. Plzeň: Fraus, 2008. 72 p. ISBN 978-80-7238-765-6.
7. Ficová, L. – Žilková, K. – Maječičková, J. 2013. Integrácia obsahu primárneho vzdelávania s podporou digitálnych technológií. In *Grant Journal*. [online]. vol. 2, no. 1 [cit. 2019-09-13]. Available online: <<http://www.grantjournal.com/issue/0201/PDF/0201ficova.pdf>>. ISSN 1805-0638.
8. Chlpošová, D. - Výboštok, J. - Kollárová, D. – Výboštová, D. 2020. Environmental education in the forest environment and its key factors in pre-elementary education. In *AD ALTA: Journal of Interdisciplinary Research*. 2020, vol. 10, no. 2, p. 151-160. ISSN 1804-7890.
9. *Inovovaný štátny vzdelávací program pre 1. stupeň ZŠ*. In www.statpedu.sk, Bratislava: ŠPÚ, 2015. 27 p.
10. Kelcova, M. 2009. *Environmentálna výchova: prierezové téma*. Bratislava: ŠPÚ, 2009. 5 p.
11. Kollárová, D. – Nagyová, A. 2020. Teachers' perception of the books of subjects of elementary realia with an emphasis on forest environment topics. In *AD ALTA: Journal of Interdisciplinary Research*. 2020, vol. 10, no. 2, p. 188-194. ISSN 1804-7890.
12. Kopáčová, J. 2011. História a súčasnosť primárneho prírodovedného vzdelávania. In *Scientific Bulletin of Chelm – Section of Pedagogy*. Chelm: Panstwowa Wyzsza Szkoła Zawodowa. vol. 2011, no. 1, p. 97-115. ISSN 2084-6770.
13. Klusák, M. 2010. Poznávání sociálního prostředí. In *Předškolská a elementární pedagogika*. Praha: Portál, 2010. p. 363-399. ISBN 978-80-7367-828-9.
14. Klusák, M. 2002. *Prvouka v 1. třídě: výzkumná správa*. Praha: Pražská skupina školní etnografie. 2002. 46 p.
15. Lenoir, Y. - Hasni, A. 2016. Interdisciplinarity in Primary and Secondary School: Issues and Perspectives. In *Creative Education*. [online]. vol. 07, no. 16 [cit. 2019-09-28]. Available online: <https://file.scirp.org/pdf/CE_2016102017124774.pdf>. ISSN 2151-4771.

16. Maňák, J. – Švec, J. 2003. *Výukové metody*. Brano: Paido, 2003. 223 p. ISBN 978-80-7315-039-5.
17. Mistrík, E. 2007. *Estetický slovník*. Bratislava: IRIS, 2007, 250 p. ISBN 978-80-8925608-2.
18. Nagyová, A. – Kollárová, D. 2021. Prvouka ako proces hľadania, objavovania a skladania obrazu okolitého sveta. In *Naša škola*, vol. 24, n. 7–8, p. 10 – 17. ISSN 1335-2733.
19. Průcha, J. – Walterová, E. – Mareš, J. (2009) *Pedagogický slovník*. Praha: Portál, 2009. 395 p. ISBN 978-80-7367-647-6.
20. *Rámcový vzdělávací program*, 2021. In. www.nuv.cz. Praha: NUV, 2021. p. 132 – 144.
21. Štěpánková, K. - Pišová, M. - Sláviková, V. 2016. Student's implicit theories about quality at the art education. In *Ad ALTA: Journal of Interdisciplinary Research*. 2016, vol. 6, no. 2, p. 116-119. ISSN 1804-7890.
22. Tóthová, R. 2014. *Konstruktivistický prístup vo výučbe ako možnosť rozvoja myslenia žiakov*. Bratislava: MPC, 2014. 90 p. ISBN 978-80-565-0004-0.
23. Velmovská, K. 2012. Medzipredmetové vzťahy a meandre riek. In *Tvorivý učiteľ fyziky V*. [online]. Bratislava: Slovenská fyzikálna spoločnosť, 2012. s. 258-267. [cit. 2019.10.04]. Available online: http://sfs.sav.sk/smolenice/pdf_12/smolenice_2012.pdf.
24. Žoldošová, K. 2006. *Východiská primárneho prírodovedného vzdelávania*. Bratislava: VEDA - Typi Universitas Tyrnaviensis, 2006. 136 p. ISBN 80-8082-095-3.

Primary Paper Section: A

Secondary Paper Section: AL, AM, DN, EH, GK

ADAPTATION OF UNIVERSITY STUDENTS OF DIFFERENT AGE GROUPS TO THE CONDITIONS OF EDUCATION

^aNINA KOZÁROVÁ, ^bJURAJ KOMORA

Constantine the Philosopher University in Nitra, Department of Pedagogy, Drážovská cesta 4, 949 74 Nitra, Slovakia
email: ^ankozarova@ukf.sk, ^bjkomora@ukf.sk

The paper was developed with support under VEGA project no 1/0391/20 called "TRANSFORMATIVE LEARNING OF THE STUDENT TEACHERS IN THE CONTEXT OF PUPILS' CRITICAL THINKING DEVELOPMENT".

Abstract: There is little in the way of obstacle to attending university nowadays. The majority of institutions have significantly reduced the selection and admission criteria for studies or they have agreed to accepting applicants without entry examinations. This fact allows study at universities even for those students whose qualitative potential does not completely correlate with the profile requirements of university studies. There can be several causes for this condition. The present study is one of the outputs of a broader research dealing with the issues of adaptation of university students of different age groups to the conditions of education. In this connection it focuses on the area of motivating students to start university studies. We do not deal with the question of selecting a specific university. We are interested in what led the respondents to the decision to complete this level of education, especially in relation to their age, where we assumed differences of opinion.

Keywords: University Studies, Motivation, Age Differences

1 Introduction

We are currently witnesses to social changes which among other things reflect the change of attitude towards the issues of education. Quite a number of universities in connection to lower population grades open up the possibility of studying at tertiary level to practically everyone who is interested. The problem today is not to get to college, but to stay and continue with studies. The reasons for graduating from university as well as the reasons for giving up on studies can vary: right or wrong motivation, a number of unmanageable obstacles, either exaggerated or unfulfilled expectations.

Recent high school graduates meet at the university with other students who have several years of work and life experience. They differ not only in their view of the world and in the way they communicate but also in their approach to the responsibilities arising from their university education. They perceive their studies in other contexts; it has a different value for them; they show a different degree of embracing education and its necessity in relation to professional and life direction. For some of them university studies affect their lives so significantly that a large number of decisions are adapted to that and for others it becomes a tool for their self-realization. In any case these differences also affect universities themselves. These circumstances have come to our attention in order to address outlined issues from different perspectives and to evaluate them in relation to age differences.

1.1 Theoretical Background of Surveyed Issues

In recent years young people's thinking and decision-making in relation to university studies has been changing significantly. The decision to continue studying at tertiary level of education should be based on a clear vision of one's own future, of one's professional and social standing. However, the fact is that only a small number of recent high school graduates have such an idea. The majority of them do not systematically think about their careers or life paths (Ližbetinová, L., 2017). This is automatically reflected in the decision making to attend the university at several levels. Many of the graduates do not apply for college immediately after finishing high school but they spend their time in a casual job or by travelling until the final decision is made.

Others decide to start university with the intention that they will not complete it, or it is their second or third choice of what to do to begin their real lives. The university thus becomes a kind of "transfer station" until a final decision is made. Last but not least it becomes evident that the numbers grow of those who in

principle do not care what university they graduate from but their priority is to obtain a university degree.

All this has become possible due to the current situation at universities whereby most institutions have significantly reduced the criteria for selecting and admitting applicants to study and these have started to admit students without entrance exams. Students themselves have adapted to this situation and when choosing a university they take into consideration the most feasible path respectively the simplest acceptance conditions. The consequence is visible in the large number of study fields and so significant reduction in the quality of incoming students. Based on the previously mentioned status, the questions are as follows: To what extent does the applicant think about his/her future path before choosing a university? What criteria are important for him/her when choosing and finishing university education? What is the value of university studies for him/her? To what extent can he/she pragmatically judge his/her abilities and approach the choice of university in the context of self-realization? Is his/her idea of the completed field of study clear and realistic?

1.2 The Procedure and Methodology of the Research

The search for answers to the above stated questions became the starting point for our research. We focused on the issue of students of different age groups adapting to the conditions of higher education. We were particularly interested in the decision-making process in connection with the completion of university studies, the specific motives that led our respondents to such a step. Our aim was to find out whether there are differences of opinion between respondents of different age groups in relation to the above facts.

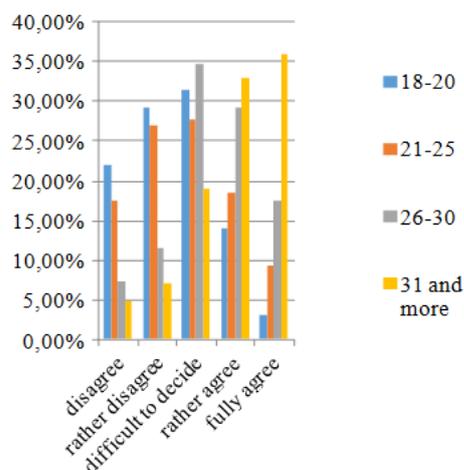
The research sample consisted of 1700 students from pedagogical faculties of various Slovak universities which were divided into four categories according to age. The delimitation of the individual categories was intentional to meet the needs of the investigation. The first category consisted of respondents aged 18-20 years. These were beginner students, fresh high school graduates and students of bachelor level. Most of them without any work experience and without experience related to university studies. The second group consisted of respondents aged 21-25, mostly master's degree students or possibly bachelor's degree students who for some reason entered the tertiary level of education little bit later. This group of respondents has slightly more study experiences and possibly work experiences compared to the previous group. The third group consisted of respondents aged 26-30 who started studying at university with a significant time gap since high school. These have certain work backgrounds but especially life experiences which move them into a different level of decision making than the respondents in the previous two groups. The last group consisted of respondents aged 31 and over. This group was the most diverse in age but not so different in opinion. The majority of the respondents share both work and life experiences (they have their jobs and family responsibilities).

The main research method was a questionnaire survey in which respondents answered seven questions where they could express their agreement or disagreement on a five-point scale (*disagree, rather disagree, difficult to decide, rather agree and agree*).

As part of our research survey we wanted to find out what led the respondents to the decision to attend their university studies. We were not primarily interested in the choice of university or field of study but the scope indicated reasons that led the respondents to enter this level of study. During the investigation it turned out that the field of study itself is a significant motivating factor. In the first question we asked our respondents to what extent the fulfilment of legislative conditions that do not allow them to perform certain professions without appropriate

education influenced their decision to take part in university studies. The results are shown in graph no. 1.

Graph no. 1 Fulfilment of Legislative Conditions for the Practice of Certain Profession

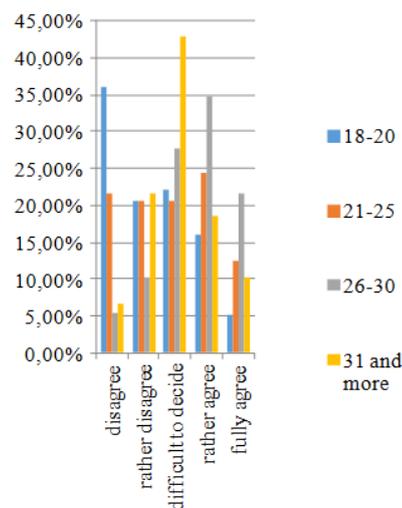


As we can see for students over the age of 31 this factor is crucial when deciding to complete a university education. As many as 36 % of them fully agreed with this statement and 32.94 % decided to rather agree with it. In fact almost 69 % expressed that meeting the legislative conditions is the main motivation for them in making decisions. We can state that we expected a similar result as the vast majority of students belonging to this age category are students of external form of studies, for whom the employer requires a legally defined qualification necessary for the performance of their profession.

This reality is also confirmed by the fact that similarly respondents in the age group 26-30 years also in large numbers (46.59 % in both options expressing agreement) expressed their agreement with the stated fact. Similarly as in the previous case even in this category a large part of the respondents are already employed or they are looking for a job which makes the fulfillment of these requirements among the motivating factors in the first place. On the other hand respondents from the other two categories who basically represent beginning students possibly bachelor's and master's degree students, clearly state that meeting the legislative conditions associated with the practice of the profession is not a priority for them in this stage of their studies. Probably because beginning students and bachelor's students still do not have a completely clear idea of their profession, despite entering a specific field of study. Most of them may not yet be aware of the importance of such decisions, which stems from a vague idea of their own future.

In the second question we asked our respondents to what extent the need to improve their theoretical knowledge and practical skills became a motive for applying to university studies. Results are shown in graph no. 2.

Graph no. 2 The Necessity to Improve Theoretical Knowledge and Practical Skills



For respondents aged 18-20 this fact is clearly not a sufficient motive in the decision-making process. As many as 36 % of them did not agree at all that the need to improve their theoretical knowledge and practical skills should be a motivating factor for them to complete university studies. If we add to them 20.71 % of those who rather disagreed with the previous statement we have almost 57 % of respondents in this age category expressing disagreement. This is probably related to the aforementioned indisposition of a clear idea of one's own future and the related need for theoretical and practical preparation for the performance of a certain profession. This raises a number of relevant questions.

For instance: for how many of the respondents is enrolment in a specific field of study only a temporary solution (transfer station)? How many of them are studying at university with the knowledge that they will never pursue the profession they are studying for? How many of them are studying at the university just to get a diploma? Is the system of support for raising the level of education in the form in which we know it nowadays satisfactory? In the introduction the fact that most of the higher educational institutions have significantly reduced their selection and admission criteria. However this must subsequently be reflected in the quality of the candidates accepted and in their responsibility to fulfil the obligations arising from the requirements for higher education.

If we look at the results of respondents aged 21-25 mostly the students of full-time master's degree an observable balance in opinions could be perceived. Almost 37 % of them agree, or rather agree that the need to improve theoretical knowledge and practical skills is an important motive for them to complete university education.

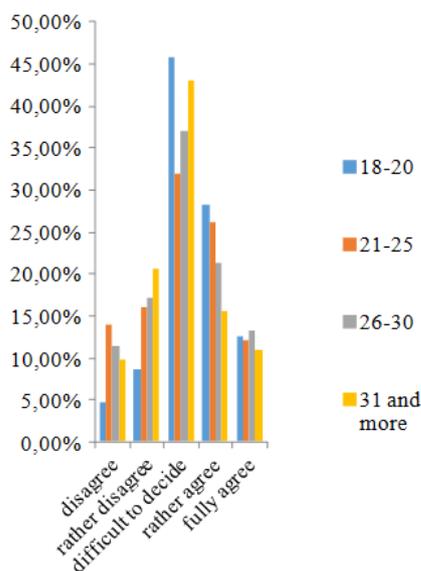
Last but not least we must not overlook the opinions of respondents aged 26-30. As many as 56.47 % of them agreed with the stated claim. Since only a small percentage of them are participants in the internal form of study we assume that as external students they are mostly at the beginning of their career without the necessary work experience; therefore, they believe that the university will thoroughly prepare them for the profession from a theoretical and practical point of view. There is a certain life experience in this group of respondents which may be the reason why the need to improve their theoretical knowledge and practical skills is of such great motivational importance to them.

On the contrary most respondents aged 31 and over have already come to an opinion that they already have acquired the necessary theoretical knowledge and practical skills so they have some doubts as to whether this fact is something that is crucial to their motivation.

In the third question we asked our respondents to what extent the long-term interest towards their dream job is motivating them to complete their university studies. The answers are shown in Graph No. 3. In this case we can state that we did not notice any significant differences in the answers of the respondents between the individual groups. We explain this by the fact that among beginning students possibly bachelor students exists a certain percentage of those who have a clear idea of their direction after graduating from university. On the other hand there are very many in the same group who did not record an opinion on this fact (45.88 %).

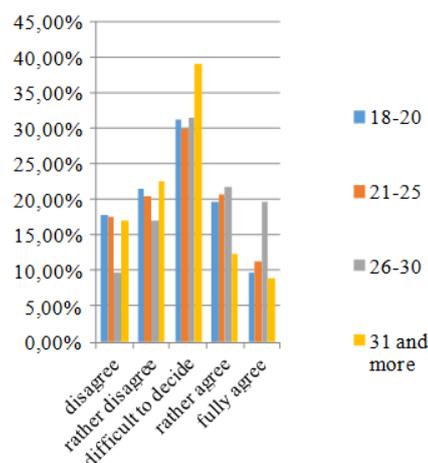
We registered a different response compared to the previous groups among respondents aged 31 and over. Among them disagreement answers prevail over positive ones in the ratio of 30.59 % to 26.35 %. This may not be a significant difference but to a certain extent it indicates the orientation of their motivation. There is a probability that respondents after several years spent in their jobs also have a lot of negative experiences which caused them to stop perceiving their job position as the one they always wanted to perform. In addition as many as 43.06 % of respondents in this group were unable to express opinion on this issue which in our point of view confirms the previous claim and also draws attention to the fact that most of them already have a job and attend university for other reasons.

Graph no. 3 Long-term Interest in the Job, which I Always Wanted to Perform



By the fourth question (Graph no. 4) we wanted to find out what percentage of respondents attends university education without a prior idea of their future employment. Most respondents expressed indecisive to dissenting attitude in the case of respondents aged 18-20, 21-25 and 31 and over.

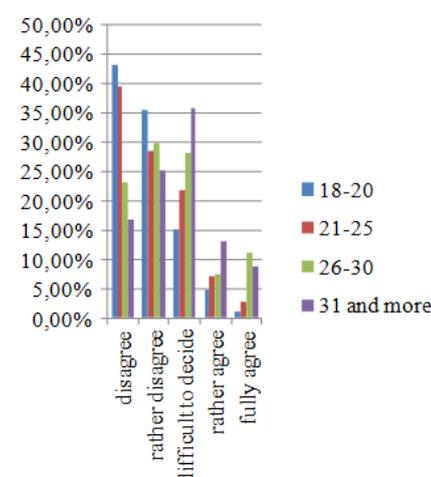
Graph no. 4 Completing the University Education without a Prior Idea of Employment



The exception were respondents aged 26-30 years. Among them 41.64% of respondents said (these are the questionnaire options I agree and rather agree) that they started attending university without a prior idea of their future employment. It turned out that the majority of them were high school graduates who started attending university in the past but for various reasons had terminated their studies or never started attending university.

The previous or current social situation (personal intentions) has led to the decision to enroll in university (some of them repeatedly) and complete their studies regardless of the relevant connection to their current or future employment. During personal interviews for a job one of the questions from the employer is regarding completed education. While graduating from university is undoubtedly an advantage often for the performance of the profession a university education is certainly not necessary. That is why these respondents do not care so much about the university from which they receive their education. In the fifth question we asked the respondents to what extent the change of employment was a motive for them to complete university studies. The answers are shown in graph no. 5.

Graph no. 5 Change of Employment (for various reasons)

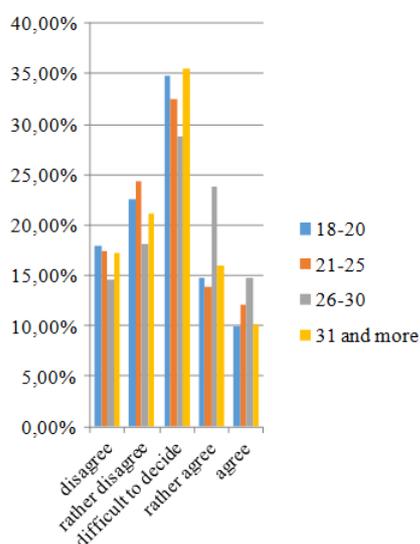


We expected that in the case of respondents aged 18-20 and 21-25, high rates would appear in the items *I disagree* and *rather disagree*. In most cases these are bachelor's and master's degree students mostly in internal study form which means that their contact with the field of work and experience with the labour market are minimal.

Most of them have so far not been confronted with the search for a job or possibly a change of job in any direction. We were more interested in the reactions of the remaining two groups of respondents on this topic. It turned out that even in their case this fact was not a motive for graduating from university. Even in the case of several respondents aged 31 and over (13.18%) it was more about a change in job classification rather than a complete change of employment. Only in the case of 11.29% of respondents aged 26-30 years was the real reason for attending university found to be a change of employment. All those who chose this option had the opportunity of a promised job position but in all cases with a requirement for a university degree.

In the sixth question we were interested in the extent to which a university education among other things has now become a trend issue and was a motivating factor for respondents to graduate from university. The answers are shown in graph no. 6.

Graph no. 6 Currently University Education is a Trend



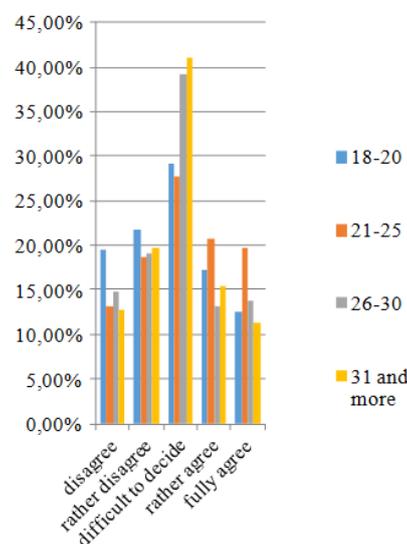
Similarly as in question no. 4 even in this case the fact was the most motivating for respondents aged 26-30 years. Of them 38.58% (amount of responses *I agree* and *rather agree*), expressed that in reality this was the strongest motive for them when deciding whether to enter a university or not, while the focus of the university or field of study was not relevant. The highest level of disagreement was declared by respondents aged 21-25 (41.64% of the answers *I disagree* and *rather disagree*), which could indicate the beginnings of a change in attitude regarding the importance of university education. After the experience from previous studies they begin to realize more clearly what the completion of a specific field of study will bring them in connection with the performance of related professions.

In the seventh question we asked the respondents to what extent the possibility of traveling abroad more easily played a role for them when deciding whether to apply for university studies. The results are shown in graph no. 7.

Universities currently try to develop cooperation with foreign universities and possibly institutions mainly through cooperation on scientific research projects, internships or through study or study-lecture stays of students and teachers. This provides students with a large number of opportunities to get acquainted not only with the academic environment at universities abroad but also with the culture of the student environment or with the culture of a specific country. In addition regardless of university affiliation student status allows you to take advantage of various programmes that make it easier to travel or work abroad. These are all reasons that led us to assume

that this fact would have a strong motivating effect to graduate from university (at least for respondents under 30).

Graph no. 7 Opportunity to Get Abroad more Easily (to study, to work)



However, our investigation has clearly shown that this is not the case. As in most cases in answering this question the majority of respondents were not able to take an attitude in terms of agreement or disagreement. Respondents aged 21-25 turned out to be the least hesitant and we can also state that agreement (40.47% of all answers *I agree* and *rather agree*) quite convincingly outweighed disagreement (31.77% of all answers *I disagree* and *rather disagree*). In our opinion this is linked to experience gained in previous years of study. Many of them have already used mentioned advantages and therefore in their further study they perceive this possibility as a significant motivating factor. On the other hand the respondents aged 18-20 by whom the disagreement (41.18%) significantly prevails over agreement (29.65%) have not yet discovered all the possibilities and benefits that university education provides.

The remaining two groups of respondents reacted to the question almost identically and presented a neutral and more negative attitude which also has a logical explanation. As we have already stated several times most of these respondents within these two groups are external students with jobs. This does not allow them to enjoy all the benefits of university student status. In addition some programmes focus exclusively on in-house students and participation in them is sometimes limited by age. In any case most respondents over the age of 30 do not even consider applying for study stays or work or travel programmes abroad. With the given question we ended our research investigations focused on determining the degree of action of selected motivational stimuli influencing respondents in deciding to complete university studies.

2 Conclusion

As part of the research focus we investigated whether there are significant differences of opinion in relation to motivation in relation to university studies with respect to different age groups of respondents. Finally we summarize the most interesting findings: For almost 69% of respondents over the age of 31 (mostly external students) the legislative conditions associated with the performance of the profession is crucial when deciding to complete a university degree. Almost 57% of respondents aged 18-20 (mostly internal bachelor's students) do not agree that the need to improve theoretical knowledge and practical skills would be a motivating factor for them to complete university studies.

More than 41% of respondents aged 26-30 (mostly external students) started attending university without a previous idea of their future job and more than 38% of them started attending as having a university degree is currently a trend.

More than 40% of respondents aged 21-25 (mostly internal master's students) are aware of the benefits of university studies in relation to travel, job opportunities or studying abroad. In the end we must state that we expected a number of findings from the research survey but there were also some that really surprised us. We are aware that we have not completely covered the issue and it will be necessary to carry out further systematic and more detailed research.

Literature:

1. Galajdová, V., Hitka, M.: *Motivácia a osobnosť*. Available online: <http://www.miloshitka.szm.com/motivacia1.html>, 2009.
2. Ližbetinová, L.: *Motivácia študentov k voľbe študovať na vysokej škole*. In *Mladá veda*. Prešov : Univerzum spol. s. r. o. Youngscience, 2017. Vol. 5 (3), pp. 46-54. ISSN 1339-3189

Primary Paper Section: A**Secondary Paper Section: AM**

MODIFICATION OF THE COMPARATIVE VALUATION METHOD FOR VALUATION OF A SET OF REAL ESTATE WITH AN INSUFFICIENTLY LARGE BATTERY OF COMPARABLE PROPERTY

^aTOMÁŠ KRULICKÝ, ^bMAREK VOCHOZKA

^a*Institute of Technology and and Business in České Budějovice, School of Expertness and Valuation, Okružní 517/10, 370 01 České Budějovice, Czech Republic*

^b*Institute of Technology and and Business in České Budějovice, School of Expertness and Valuation, Okružní 517/10, 370 01 České Budějovice, Czech Republic*
email: ^akrulicky@mail.vstecb.cz, ^bvochozka@mail.vstecb.cz

Abstract: The aim of this paper is to present a suggestion for the modification possibility of a selected valuation method which can be used to value real estate in case it is not possible to find a sufficiently large battery of comparable real estate to determine the estimate of the market price. The modification of the selected valuation method consists in the double use of correction coefficients in the creation process of the so-called standardized unit of thought which serves as an intermediary in the valuation of specific real estate. Based on the results achieved by the application, it was concluded that such a modified valuation method can be used to estimate the market price of a set of real estate more quickly and efficiently.

Keywords: comparative valuation method, real estate valuation, standardized unit of thought, correction coefficients

Introduction

Valuation is involved in many fields across different industries. The assessor presents his opinion on the usual price of the subject of valuation (i.e., the market price) as a third impartial and unaffected person. However, in specific cases of valuation, this can be a very complex process which, in most cases, requires a large battery of input data serving as a basis for determining the correct (reasonable) market price with respect to all facts that are specific to the subject of valuation. The correct and sufficient size of the input data battery is also important in order to be able to substantiate the presented valuation result with the relevant facts on which the valuation result is based.

The assessor is faced with requirements for the valuation of various types of both movable and immovable property or their sets, as well as with the valuation of various types of assets (tangible, intangible and financial). However, it is always necessary for the assessor to approach each subject of valuation individually as this is the only way to approach the task correctly while maintaining the perspective of a third independent rational person.

A very specific area explored in the field of valuation as such is the real estate valuation. Several valuation methods can be used to value real estate. However, they are all demanding on the size of the input data battery as in the case of other valuation items (movables, businesses, etc.). The real estate market seems to be a place where, in terms of valuation, obtaining a sufficiently large battery of input data should be fairly simple. In specific cases, however, the opposite may be true.

The aim of this paper is to provide a valuation of a set of real estate – namely residential units (RU), commercial units (CU) and non-residential units (NU) – if there is lack of input data for the valuation of each of the specific real estate field using a modified methodological process commonly used for real estate valuation. To demonstrate the application of the modified valuation methods, these methodological procedures will be applied to a model real estate.

1 Literature research

The assessor's view of the subject of valuation should always remain unbiased and the estimated market price should be supported by relevant background data from a sufficiently large data battery. Subsequently, the assessor should take into

consideration all circumstances and influences having any effect on the market price of the assessed object.

According to Bellman et al. (2016), assessors with a university degree in the field of expertness and valuation use more complex thought processes and formulas in the valuation procedures than assessors without such focused education. This ultimately affects the correctness and credibility of their decisions. Kucharska-Stasiak (2014) sought the reasons and possible causes of different opinions on the market price of the subject of valuation of two or more appraisers. She also adds that legislation containing a description and precise definition of valuation principles should help to unify the resulting market price of the subject of valuation in case multiple assessors value the same object. This should also contribute to the plausibility of the set market price of the subject of the valuation. The expert should also have an overview of price maps of the areas in which he performs expert activities. Index maps can also be used for this purpose. Index maps contain information on the values of real estate in a given area, which have been determined in the previous few years (Hromada, 2013).

Several valuation methods can be used when valuing real estate. According to Gabrielli and French (2020), the assessor should first correctly identify the valuation method that they plan to apply. Subsequently, they must perform the given mathematical calculation without errors. However, all assessors should adhere to International Valuation Standards established by the Valuation Standards Board when determining the market price of a particular item.

In valuation practice, however, new valuation methods are gradually being added, which provides the possibility of more accurate determination of the market price of the subject of valuation. With the help of these new valuation methods, it is possible to reduce the difference between the market price of the subject of valuation determined by the assessor and the final sale price in the purchase/sale relationship. According to Abidoy et al. (2019) who conducted a questionnaire survey among Australian assessors, the assessors rarely accept new valuation methods.

However, many assessors specialize in valuation of specific items. A large part consists of assessors who deal with real estate valuation. In some cases of real estate sales, however, the owners determine the offer price of the real estate themselves without any prior knowledge of the real estate market. In many cases, these are very exorbitant price offers which destabilize the entire real estate market in the area. According to Small et al. (2016), this should be prevented by paying attention to the economic sustainability of the set market price when determining the market price of the subject of valuation. Otherwise, the destabilization of the real estate market would have negative economic and political consequences. However, according to Meszek (2013), the real estate market may present inhomogeneous information about the market prices of specific properties. Therefore, a property owner who wants to sell his property has little chance of setting a reasonable and realizable offer price which would eventually become the final sale price without any further changes. This is caused by the fact that the offer prices on the real estate market are very different from the final sale prices and the laymen thus do not have the opportunity to orientate themselves effectively on this market.

Many authors also dealt with the individual valuation methods that can be used in real estate valuation. Krulický et al. (2020) provided a comparison of a property valuation result regarding the property as a single functional unit with the valuation result taking into account its individual parts as the spatial disposition of the property which was referred to as the model valuation item allowed the seller to choose between the two sales options.

As the assessed real estate consisted of both residential and commercial premises, a combination of the property and income valuation methods was used for the partial valuation of the real estate. Kutasi and Badics (2016) examined various valuation methods that can be used in real estate valuation, especially in predicting the development of the market prices, including the determinants that influence this development. They dealt mainly with hedonic regression analysis and real estate valuation using artificial neural networks (ANN). Based on the achieved results, they came to the conclusion that ANN of the Multi-Layer Perceptron (MLP) type are most suitable for predicting the development of real estate market prices. Hromada (2016) consider the comparative method of valuing real estate as the most common, and he himself proposes a method of valuation using data mining software. This software containin historical detailed information about realized sales of real estate from the begining of their initial offer. The use of the hedonic valuation model in the field of real estate valuation is a much-discussed topic itself. Evans (2012) examined the accuracy of the hedonic valuation model in the field of real estate valuation. However, its accuracy depends heavily on the fact whether the market price of the property is adjusted accordingly after its application. However, this is very difficult to verify due to the model's nature. According to Abidoy and Chan (2018), the hedonic valuation model is very inaccurate, so they made a comparison of a prediction using this model and the ANN. It was found out that the prediction of the real estate market price is more accurate using the ANN than using the hedonic valuation model. They, therefore, recommend the use of ANN to predict the development of the market value of real estate.

In its application, the hedonic model takes into account aspects that are directly related to the environment and environmental influences that may have an external impact on the creation of the market price of the valued real estate. Kucharska-Stasiak and Olbińska (2018) dealt with the environmental valuation of sustainable buildings. Sustainable properties should bring certain economic benefits to their owners. However, current valuation models are not able to incorporate the sustainability viewpoint into the valuation process.

An independent category of real estate valuation is represented by valuation of new buildings. Ferreira et al. (2016) used a multi-criteria valuation method to determine the market price of a new building. According to them, cognitive mapping and measuring attractiveness by a categorical based evaluation technique can help in using the multicriteria valuation method to reasonably estimate the bid prices of new buildings.

Tajani et al. (2019) note that different institutions (banks, insurance companies, etc.) need to constantly determine the market price of very similar types of real estate. Therefore, they propose the creation of a model property as a universal building which is valued at the usual market price. According to the location and the subsequent application of weights, the usual market price of the model property would be modified to determine the market price of the valued property which differs only slightly from the model property. Gdakowicz and Putek-Szeląg (2020) used statistical methods to determine the individual weights to determine the market value of real estate. Tajani et al. (2018) have also proposed an automated valuation model for real estate valuation in the past. This valuation model was based on model real estate the value of which is assessed by means of all the usual valuation methods (property, yield and market). Later on, this model property can be used as a comparison parameter to value other properties or their sets.

During the economic crisis, individual markets are destabilized. This also applies to the real estate market. Due to the unfavourable economic situation, the real estate market thus becomes an inefficient and inhomogeneous market. Alexandridis et al. (2019) therefore compared the applicability of linear and nonlinear models based on regression, hedonic models and ANN to predict the development of the market price of real estate in an environment of the unstable and inhomogeneous real estate market. By combining all of the above methods, prediction

errors can be eliminated to a minimum. According to Krulický and Horák (2019), real estate can also be seen as an investment opportunity. Baranano et al. (2020) used the Monte Carlo simulation to determine the size of the investment risk in real estate for the individual institutions (especially for banks and insurance companies) and to determine the amount of capital needed as a guarantee. This provides a possibility of incorporating possible losses into the valuation model. Vrbka et al. (2020) also point out, however, that due to incorrect investment in real estate, its value may even decrease.

The current phenomenon on the real estate market consists in different owners of the building and the land on which the building stands. Vrbka et al. (2019) therefore dealt with the determination of the rent for the built-up part of the building plot, the owner of which does not coincide with the owner of the building standing on the incriminated part of the plot. Jilemnicka, Berka and Hromada (2008) were interested in the development of the real estate market in the Czech Republic. Software EVAL, was used for mapping and evaluation of the real estate market development.

2 Data and methods

First, thought residential units will be created which will represent a standardized RU without any peculiarities and will subsequently serve as intermediaries for valuing RU in model real estate demonstrating the use of a modified methodology for valuing real estate with a small battery of comparable units. A comparative valuation method with the application of correction coefficients will be used and the unit price of RU will be determined on the basis of the offer prices obtained by a survey of RU offered for sale on Internet real estate portals. To assess the value of a specific RU in the model real estate, correction coefficients will again be applied to the determined unit price of the standardized thought RU to specify and take into account the specific properties of the valued unit in the model real estate. Other CU and NU in the model real estate will be valued using the yield valuation method.

The model property consists of six above-ground floors and two underground floors. The whole property has a total of 12 RU, two CU and two NU. The CU in the model real estate represents two commercial stores and the NU represent storage spaces that can be used independently of other units in the model real estate. For a more detailed description, a list of all units together with their spatial disposition and floor surface area is given in Table 1.

Table 1: Units in the model real estate including their spatial disposition and floor surface area

ID	Type of Unit	Spatial Disposition	Floor Surface Area [m ²]
1	BJ 1	1+1	38.84
2	BJ 2	2+1	48.11
3	BJ 3	3+1	87.22
4	BJ 4	2+1	76.40
5	BJ 5	3+1	85.72
6	BJ 6	2+1	79.81
7	BJ 7	2+1	84.50
8	BJ 8	3+1	82.50
9	BJ 9	3+kitchenette	83.74
10	BJ 10	2+1	80.21
11	BJ 11	1+1	49.97
12	BJ 12	1+kitchenette	31.21
13	CU 1		63.85
14	CU 2		80.27

15	NU 1		65.31
16	NU 2		68.73

Source: Authors.

In the first step, the standardized thought RU will be created. The RU in the model property will be divided into two groups according to the size of the floor area. Group No. 1 will include RU with 50 m² of floor surface area, i.e., RU No. 1, 2, 11 and 12. Group No. 2 will include RU with more than 50 m² of floor surface area, i.e., RU No. 3-10. Subsequently, two batteries of similar RU will be searched on Internet real estate portals for both created RU groups. When searching for a suitable battery of comparable data, the floor surface area of the offered RU will be primarily taken into account, i.e., up to ± 50 m² and over 50 m². Based on the floor surface area and the offer prices of RU, the unit offer price (UOP) for each of the identified RU for sale from both groups will be determined. Subsequently, the correction factors K₁-K₅ will be applied to the individual UOP of the traced RU in order to create an adjusted unit price (AUP) of the standardized thought RU for both groups. The coefficients K₁-K₅ represent the following correction criteria: K₁ – the coefficient of reduction of the price source will be used in all cases, as it is always the offer price of the RU in question; K₂ – the locality coefficient will represent the degree of difference from the standardized RU; K₃ – technical condition will represent the difference of the technical condition of RU in comparison with the standardized thought RU; K₄ – coefficient of fittings will compare the equipment of RU in the form of ancillary buildings, real estate equipment or specifics of land belonging to buildings and, finally, coefficient K₅ – coefficient of time interval taking into account the general developments in real estate prices. After applying these correction coefficients, the AUP of each of the detected RU in both groups will be determined. The subsequent creation of the average of all AUP will determine the unit price (UP) of the standardized thought RU for each of the RU groups separately.

After determining the UP created for the standardized thought RU in both groups, selected correction coefficients will be applied to these unit prices once more taking into account the differences between the standardized thought RU and the RU which are valued within the model real estate. These will be the correction coefficients K₂-K₄. The correction coefficients K₁ and K₅ will no longer be applied as the UP created for both groups of standardized RU is not an offer price, nor is there any time lag in the development of real estate prices. By applying the correction coefficients K₂-K₄, the adjusted unit price of the residential unit (AUP^{RU}) will be determined for both groups which are valued within the model real estate. A subsequent multiplication of AUP^{RU} by the floor surface area of the RU from both groups will determine the market prices of all RU in the model real estate.

Furthermore, the valuation of CU and NU will be performed. As CU and NU can generally be expected to have their future revenue potential, these units will be valued using the yield valuation method. However, when using the yield valuation method, from the point of view of a third independent rational person represented by the assessor, it is necessary to follow the highest and best use rule. In valuation practice, this rule is obeyed when determining the amount of potentially collected rent. To determine the potential amount of collected rent from CU and NU in the model real estate, an input data battery containing CU rental offer prices and an input data battery containing NU rental offer prices will be traced on online real estate portals. Based on the offer prices and the floor surface area in both data batteries, UOP from the rent of CU and NU will be determined. Subsequently, the UOP from both data batteries will be adjusted using the correction coefficients K₁-K₃. After applying the correction coefficients K₁-K₃, the adjusted offer unit prices of individual CU (AUOP^{CU}) and NU (AUOP^{NU}) will be determined. Subsequent creation of averages of all AUOP^{CU} and AUOP^{NU} will determine the average amount of AUOP^{CU} and AUOP^{NU}.

Furthermore, the amount of potential annual rent from the lease of CU and NU in the model real estate will be determined using the Formula No. 1.

$$\begin{aligned} & \text{potential annual rent} \\ &= \text{average AUOP} * 12 \text{ months} \\ & * \text{floor surface area.} \end{aligned} \quad (1)$$

In the next step, the yield value of CU and NU will be determined. The calculation of the yield value of CU and NU must take into account the possible loss of rent for the owner in the amount of 10% of the potential annual rent, which represents a certain reserve when changing the tenant of the CU and NU. Furthermore, it is necessary to take into account the costs of insurance and other expenses associated with the operation of CU and NU, as the operation of these units is riskier than the operation of RU. These costs will be calculated in the total amount of 30%. Finally, the capitalization rate will be applied to determine the market value of CU and NU. The capitalization rate for CU is set at 7% by a decree (Czechia, 2013). In the case of German, where storage facilities are specific, the capitalization rate is set at 6% by decree (Czechia, 2013). The yield value of CU and NU will be determined according to the Formula No. 2.

$$\begin{aligned} & \text{Yield value} \\ &= \frac{\text{potential annual rent reduced by costs}}{\text{annual capitalization rate}} \end{aligned} \quad (2)$$

Subsequently, the unit price will be determined for the rent of CU and NU by the share of the total yield value for CU and NU and the total floor surface area of both units forming the CU and NU in the model real estate.

In the next step, the yield value of each of the CU and NU will be determined by the product of unit price for the rent of CU and NU and by the specific floor surface area of the particular CU and NU.

To determine the total market value of the model property, the sum of the market values of all units in the model property determined by specific valuation methods will be performed.

3 Results

To begin with, thought residential units were created which represent the standardized RU for both groups of RU created for valuation within the model real estate. A total of 12 RU offers were found on internet real estate portals which corresponded in their parameters to the floor surface area of Group No. 1. The offered residential units are listed in Table 2.

Table 2: Residential units offered on internet real estate portals with a determined unit price (Group No. 1)

ID	Price [CZK]	Floor Surface Area [m ²]	Unit Price [CZK/m ²]
1	2,200,000	42	52,381
2	2,249,000	42	53,548
3	1,896,800	36	52,689
4	2,492,600	47	53,034
5	2,190,000	48	45,625
6	2,024,000	44	46,000
7	1,950,000	41	47,561
8	2,550,000	51	50,000
9	2,190,000	48	45,625
10	2,585,000	51	50,686
11	2,470,000	51	48,431
12	2,390,000	52	45,962

Source: Authors.

According to Table 2, it is evident that the unit offer price for residential units with the floor surface area up to $\pm 50 \text{ m}^2$ ranged from 53,548 CZK/m² to 45,625 CZK/m².

Subsequently, a total of 8 RU offers were again found on internet real estate portals which corresponded in their parameters to the floor surface area of RU in Group No. 2. The offered residential units are listed in Table 3.

Table 3: Residential units offered on internet real estate portals with a determined unit price (Group No. 2)

ID	Price [CZK]	Floor Surface Area [m ²]	Unit Price [CZK/m ²]
1	2,785,000	79	35,253
2	1,647,000	70	23,529
3	3,750,000	82	45,732
4	3,399,000	88	38,625
5	3,999,000	84	47,607
6	3,580,000	74	48,378
7	3,590,000	75	47,867
8	3,690,000	79	46,709

Source: Authors.

Table 3 shows that the unit offer price of residential units with floor surface areas large than 50 m² ranged from 23,529 CZK/m² to 48,378 CZK/m².

In the next step, the correction coefficients K₁-K₅ were applied to the determined UOP in both groups of RU. Subsequently, the created adjusted offer prices were averaged and thus, unit prices of the standardized thought RU were created for both groups. The results of the application of correction coefficients and the resulting unit prices of the standardized thought residential units are shown in Tables 4 and 5.

Table 4: Results of the application of correction coefficients K₁-K₅ along with the determination of the average adjusted unit price of the standardized thought residential unit for Group No. 1

ID	UP [CZK/m ²]	K ₁	K ₂	K ₃	K ₄	K ₅	AOP [CZK/m ²]
1	52,381	0.90	1.05	0.95	1.00	1.00	47,025
2	53,548	0.90	1.00	0.95	1.00	1.00	45,783
3	52,689	0.90	1.00	1.00	1.00	1.05	49,791
4	53,034	0.90	1.00	0.92	1.03	1.07	48,396
5	45,625	0.90	1.00	1.00	1.03	1.07	45,255
6	46,000	0.90	1.07	1.00	1.00	1.00	44,298
7	47,561	0.90	1.00	1.05	1.00	1.00	44,945
8	50,000	0.90	1.05	1.00	1.05	0.95	47,132
9	45,625	0.90	1.05	1.00	1.03	1.00	44,409
10	50,686	0.90	1.05	1.00	1.05	0.95	47,779
11	48,431	0.90	1.00	1.03	1.05	1.05	49,498
12	45,962	0.90	1.05	0.93	1.05	1.07	45,382
Mean							46,641

Source: Authors.

According to Table 4, the average adjusted unit price of the standardized thought residential unit for Group No. 1 was set at 46,641 CZK/m².

Table 5: Results of the application of correction coefficients K₁-K₅ along with the determination of the average adjusted unit price of the standardized thought residential unit for Group No. 2

ID	UP [CZK/m ²]	K ₁	K ₂	K ₃	K ₄	K ₅	AUP [CZK/m ²]
1	35,253	0.90	1.07	1.07	1.00	1.05	38,141
2	23,529	0.90	1.15	1.10	0.95	1.07	37,285
3	45,732	0.90	1.05	0.90	1.00	1.05	38,571
4	38,625	0.90	1.05	1.05	1.05	1.07	43,059
5	47,607	0.90	1.05	0.95	1.00	1.00	42,739
6	48,378	0.90	1.05	1.00	1.00	1.00	45,718
7	47,867	0.90	1.05	1.00	1.00	1.00	45,234
8	46,709	0.90	1.05	0.95	1.00	1.00	41,933
Mean							41,585

Source: Authors.

According to Table 5, the average adjusted unit price of the standardized thought RU in Group No. 2 was set at 41,585 CZK/m².

Subsequently, the correction coefficients K₂-K₄ were applied to the average adjusted unit price of the standardized thought RU according to the specific specifics of the residential units from Group No. 1 in the model real estate. Table 6 shows the applied correction coefficients for the average AUP of the standardized thought RU according to the specific specifics of RU which belong to Group No. 1 in the model real estate.

Table 6: Determining the adjusted unit price of residential units (AUP^{RU}) for Group No. 1

ID	AUP [CZK/m ²]	K ₂	K ₃	K ₄	AUP ^{RU} [CZK/m ²]
1	46,641	1.00	0.90	0.90	37,779
2	46,641	0.95	0.90	0.95	37,884
11	46,641	0.95	0.75	1.00	33,232
12	46,641	1.05	1.00	1.00	48,973

Source: Authors.

Based on the floor surface area of the individual units, the market prices of the particular units were subsequently determined. Moreover, the sum of all market values of RU in Group No. 1 was determined. Table 7 shows the determined market prices of RU from Group No. 1 on the basis of AUP^{RU}.

Table 7: Market prices of residential units from Group No. 1 on the basis of AUP^{RU}

ID	Floor Surface Area [m ²]	AUP ^{RU} [CZK/m ²]	Final Price [CZK]
1	38,84	37,779	1,467,000
2	48,11	37,884	1,823,000
11	49,97	33,232	1,661,000
12	31,21	48,973	1,528,000
Total			6,479,000

Source: Authors.

Based on the floor surface areas of the residential units and the AUP^{RU}, the total market price of the residential units in Group No.1 was set at 6,479,000 CZK.

In the next step, the correction coefficients K₂-K₄ were applied to the AUP of the standardized thought residential units according to the specifics of RU from Group No. 2 in the model real estate. Table 8 shows the applied correction coefficients for the average adjusted unit price of the standardized thought unit

according to the specifics of RU from Group No. 2 in the model real estate

Table 8: Determining the adjusted unit price of residential units (AUP^{RU}) for Group No. 2

ID	AUP [CZK/m ²]	K ₂	K ₃	K ₄	AUP ^{RU} [CZK/m ²]
3	41,585	1.10	1.00	1.00	45,743
4	41,585	1.00	1.00	1.00	41,585
5	41,585	0.95	1.00	1.00	39,506
6	41,585	0.90	1.00	1.00	37,426
7	41,585	0.95	1.00	1.00	39,506
8	41,585	1.00	1.00	1.00	41,585
9	41,585	1.12	1.00	1.00	46,575
10	41,585	1.05	1.00	1.00	43,664

Source: Authors.

Based on the floor surface area of the individual units, the market prices of the particular units were subsequently determined. Moreover, the sum of all market values of RU in Group No. 2 was determined. Table 9 shows the determined market prices of RU from Group No. 2 on the basis of AUP^{RU}

Table 9: Market prices of residential units from Group No. 2 on the basis of AUP^{RU}

ID	Floor Surface Area [m ²]	AUP ^{RU} [CZK/m ²]	Final Price [CZK]
3	87.22	45,743	3,990,000
4	76.40	41,585	3,177,000
5	85.72	39,506	3,386,000
6	79.81	37,426	2,987,000
7	84.50	39,506	3,338,000
8	82.50	41,585	3,431,000
9	83.74	46,575	3,900,000
10	80.21	43,664	3,502,000
Total			27,711,000

Source: Authors.

Based on the floor surface areas of the residential units and the AUP^{RU} , the total market price of the residential units in Group No. 2 was set at 27,711,000 CZK.

Subsequently, CU and NU were valued. In the case of CU, it was necessary to start by finding a sufficiently large battery of input data to determine the average potential collected rent. A total of 10 rental offers for commercial units were found on internet real estate portals. The monthly rent, including the floor surface area and the determination of the unit offer price, is given in Table 10.

Table 10: Commercial units offered for rent

ID	Offer Price [CZK]	Floor Surface Area [m ²]	Unit Offer Price [CZK/m ²]
1	58,000	116	500
2	32,500	128	254
3	18,000	48	375
4	15,000	51	294
5	22,000	87	253
6	14,000	61	230
7	19,360	46	421
8	37,000	145	255
9	59,000	144	410
10	37,500	129	291

Source: Authors.

According to Table 10, it is evident that the UOP in the offers of commercial units for rent ranged from 230 CZK/m² and 500 CZK/m².

Subsequently, the correction coefficients K₁-K₃ were applied to the unit offer price of the found CU rental offers according to the specifics of the CU in the model real estate. Table 11 shows the application of the correction coefficients on the unit offer price of the commercial units and documents the establishment of the adjusted unit offer prices of CU ($AUOP^{CU}$).

Table 11: Determining the $AUOP^{CU}$

ID	UOP [CZK/m ²]	K ₁	K ₂	K ₃	AUOP ^{CU} [CZK/m ²]
1	500	0.90	0.90	0.85	344
2	254	1.10	1.10	1.00	307
3	375	0.95	1.00	1.00	356
4	294	0.95	1.05	1.05	308
5	253	0.95	1.10	1.00	264
6	230	0.95	1.10	1.00	240
7	421	1.00	1.00	1.00	342
8	255	0.95	0.90	1.00	218
9	410	0.85	1.00	1.00	348
10	291	0.95	1.00	1.00	276
Mean					300

Source: Authors.

According to Table 11, it is clear that the average $AUOP^{CU}$ is 300 CZK/m². Based on the data given in Table 1, the total size of the floor surface areas of all commercial units in the model property was set at 144.12 m².

Subsequently, the amount of the potential annual rent from the CU lease was determined using Formula 3. After substituting into the formula, the following relationship was obtained:

$$\begin{aligned}
 \text{Potential annual rent} &= 300 \text{ CZK/m}^2 \\
 &* 12 \text{ months} * 144.12 \text{ m}^2 \\
 &= \mathbf{518,832 \text{ CZK}}.
 \end{aligned} \quad (3)$$

Subsequently, the yield value of the individual commercial units in the model real estate was determined. First, the potential annual rent was reduced by 10% representing a certain reserve in case tenants should change (518,832 CZK - 10% = 466,949 CZK).

All costs associated with the maintenance and insurance of the CU were also taken into account in the amount of 30% (466,949 CZK - 30% = 326,864 CZK).

In the next step, the capitalization rate for CU was applied to determine the yield value of all commercial units in the model real estate by using Formula 4:

$$\text{Yield value} = \frac{326,864 \text{ CZK}}{7\%} = 4,669,486 \text{ CZK}. \quad (4)$$

By the subsequent share of the yield value of all commercial units and their total floor surface area, the unit price for the lease of CU was determined (4,669,486 CZK/144.12 m² = 32,400 CZK/m²).

Finally, to determine the yield value of the individual commercial units, the yield values of the individual commercial units in the model real estate were determined on the basis of the floor surface area according to Table 1.

$$\begin{aligned}
 CU1 &= 32,400 \text{ CZK} * 63.85 \text{ m}^2 \\
 &= \mathbf{2,068,740 \text{ CZK}}.
 \end{aligned}$$

$$\begin{aligned} CU2 &= 32,400 \text{ CZK} * 80.27 \text{ m}^2 \\ &= 2,600,748 \text{ CZK}. \end{aligned}$$

After performing the calculations, CU1 was valued at 2,068,740 CZK and CU2 was valued at 2,600,748 CZK using the yield method in both cases.

In the case of non-residential units, it was also first necessary to find a sufficiently large battery of input data to determine the average potentially collected rent. A total of 6 NU rental offers were found on internet real estate portals. The amount of monthly rent including the floor surface area and the determination of the unit offer price is given in Table 12.

Table 12: Rental offers for non-residential units

ID	Offer Price [CZK]	Floor Surface Area [m ²]	Unit Offer Price [CZK/m ²]
1	24,000	360	66
2	2,000	50	40
3	17,500	300	58
4	11,895	178	67
5	35,000	430	81
6	17,000	214	79

Source: Authors.

According to Table 12, it is obvious that the UOP ranged from 40 CZK/m² to 81 CZK/m² for the found NU rental offers.

Subsequently, the correction coefficients K₁-K₃ were applied to the UOP of the NU rental offers according to the specifics of the particular NU in the model real estate. Table 13 shows the applied correction coefficients for the unit offer price and sets the adjusted unit offer prices (AUOP^{NU}).

Table 13: Determining the AUOP^{NU}

ID	UOP [CZK/m ²]	K ₁	K ₂	K ₃	AUOP ^{NU} [CZK/m ²]
1	66	1.00	1.00	0.85	56
2	40	1.02	1.00	0.95	39
3	58	1.02	0.95	0.95	53
4	67	1.02	0.95	0.90	58
5	81	1.02	0.95	0.80	63
6	79	1.02	0.95	0.85	65
Mean					56

Source: Authors.

According to Table 12, it is clear that the average AUOP^{NU} totals 56 CZK/m². Based on the data given in Table 1, the total size of the floor surface areas of all non-residential units in the model property was set at 134.04 m².

Subsequently, the amount of potential annual rent from the lease of NU was determined using Formula 1. After substituting into the formula, the following relationship was obtained:

$$\begin{aligned} \text{Potential annual rent} &= 56 \text{ CZK/m}^2 * 12 \text{ months} \\ &* 134.04 \text{ m}^2 \\ &= \mathbf{90,075 \text{ CZK}}. \end{aligned} \quad (5)$$

Subsequently, the yield value of individual NU in the model real estate was determined. First, the potential annual rent was reduced by 10% representing a certain reserve in case tenants should change (90,075 CZK - 10% = 81,068 CZK).

All costs associated with the maintenance and insurance of the NU were also taken into account in the amount of 30% (81,068 CZK - 30% = 56,748 CZK).

In the next step, the capitalization rate for NU was applied to determine the yield value of all non-residential units in the model real estate. For this purpose, Formula 2 was used.

$$\text{Yield value} = \frac{56,748 \text{ CZK}}{6\%} = 945,800 \text{ CZK}. \quad (6)$$

By mean of the subsequent share of the yield value of all non-residential units and their total size of floor surface areas, the unit price was determined for the lease of NU (945,800 CZK / 134.04 m² = 7.056 CZK/m²).

Finally, in order to determine the yield value of the individual non-residential units, the yield values of the individual NU in the model real estate were determined on the basis of the floor surface areas according to Table 1.

$$NU1 = 7,056 \text{ CZK} * 65.31 \text{ m}^2 = 460,827 \text{ CZK} \quad (7)$$

$$NU2 = 7,056 \text{ CZK} * 68.73 \text{ m}^2 = 484,959 \text{ CZK}$$

After performing the calculations, NU1 was valued at 460,827 CZK and NU2 was valued at 484,959 CZK using the yield method in both cases.

Finally, the sum of all units that formed the model property was valued according to the relevant valuation methods. Table 14 lists all specified values of the individual units and their groups in the model real estate.

Table 14: Market values of the individual constituting units of the model real estate

Type of the Constitution Unit	Market Value [CZK]
RU (Group No. 1)	6,479,000
RU (Group No. 2)	27,711,000
CU1	2,068,740
CU2	2,600,748
NU1	460,827
NU2	484,959
Total	39,805,274

Source: Authors.

The sum of the market values of the individual units and their groups which form together the observed model property determined its total market value at 39,805,274 CZK.

4 Discussion

In all areas of research and development, various procedures and methods are being modernized over time, the progress of which will always improve the previous methodological procedures in a certain direction. These innovative approaches and methods usually involve the implementation of other complex steps that can be used to improve the final product. In some cases, however, such progress is not required and, ultimately, not effective. In these cases, we can talk about an innovation that will bring a certain universality of the whole process and thus this process can be used in other areas than for which it was originally designed.

In the valuation practice, a typical shortcoming of a large set of valuation methods is the need for the largest possible battery of input background data to determine the most accurate estimate of the market price of the subject of valuation. In some cases, it is not even possible to find adequate input data for the subject of valuation on the basis of which it would be possible to determine the market price of the subject of valuation. For this reason, in valuation practice, it is constantly talked only about estimates of market prices of the valued items. However, the presented methodological procedure enables the valuation of a specific subject of valuation even if the assessor, for whatever reason, does not have a sufficiently large battery of input data for the valuation of this subject.

Furthermore, the requirement of data relevance is placed on the battery of input data in the form of their biggest possible similarity in all pricing factors with the subject of valuation. By creating a standardized unit of thought, this shortcoming which can also be encountered in valuation practice can also be eliminated very effectively. By re-applying the correction coefficients, the entire set of valuation items can be valued using a standardized unit without the need to search for another battery of input data.

5 Conclusion

The aim of this paper was to present a modified version of specific valuation methods which can be used if a sufficiently large battery of input data is not available in order to determine the market price of the subject of valuation. The modification of the comparative valuation method was performed using a standardized model property playing the role of means for a double application of the selected correction coefficients. This procedure should take into account all parameters of an inhomogeneous set of valuation items even if there is no sufficient battery of input data for each item of this inhomogeneous set. The aim of the contribution was thus met. A modified version of the comparative valuation method was applied to value the model property. The total market price of the model real estate resulted at 39,805,274 CZK based on the application of the modified valuation methods.

Future research could look at the possibilities of modifying the yield valuation methods which could lead to their unification as it was the case of the comparative valuation method in this paper. This would be appreciated mainly by the assessors as they often encounter a lack of input data for determining the market prices of the valuation subject and not only in the field of real estate valuation.

The limitations of this modification are found in the impossibility of applying a standardized thought unit to the valuation of any type of real estate. When applying this modified method, it is therefore always necessary to create a standardized unit of thought for each type of real estate separately.

Literature:

1. Abidoye, R. B., Chan, A. P. C.: Improving property valuation accuracy: a comparison of hedonic pricing model and artificial neural network. *Pacific Rim Property Research Journal*. 2018, 24(1), 71-83 p. ISSN 1444-5921.
2. Abidoye, R. R., Junge, M., Lam, T. Y. M., Oyedokun, T. B., Tipping, M. L.: Property valuation methods in practice: evidence from Australia. *Propetry Management*. 2019, 37(5), 701-718 p. ISSN 0263-7472.
3. Alexandridis, A. K., Karlis, D., Papastamos, D., Andritsos, D.: Real Estate valuation and forecasting in non-homogeneous markets: A case study in Greece during the financial crisis. *Journal of the Operational Research Society*. 2019, 70(10), 1769-1783 p. ISSN 0160-5682.
4. Baranano, A., De La Pena, J. I., Moreno, R.: Valuation of real-estate losses via Monte Carlo simulation. *Economic Research-Ekonomska Istrazivanja*. 2020, 33(1), 1867-1888 p. ISSN 1331-677X.
5. Bellman, L., Lind, H., Öhman, P.: How does education from a high-status university affect professional property appraisers' valuation judgments? *Journal of Real Estate Practice and Education*. 2016, 19(2), 99-124 p. ISSN 1521-4842.
6. Czech Republic, Decree No. 441 from 17. December 2013, on the implementation of the law on property valuation. In: Legal Code of the Czech Republic. 2013, Part 173, 7422-7611. ISSN 1211-1244.
7. Evans, T. A.: An estimate of the accuracy of hedonic real estate valuations using the orange county bankruptcy. *Economica*. 2012, 79(316), 703-720 p. ISSN 0013-0427.
8. Ferreira, F. A. F., Spahr, R. W., Sunderman, M. A.: Using multiple criteria decision analysis (MCDA) to assist in estimating residential housing values. *International Journal of Strategic Property Management*. 2016, 20(4), 354-370 p. ISSN 1648-715X.
9. Gabrielli, L., French, N. (2020): Pricing to market: property valuation methods – a practical review. *Journal of Property Investment and Finance*. 2020, ISSN 1463-578X.
10. Gdakowicz, A., Putek-Szeląg, E.: The use of statistical methods for determining attribute weights and the influence of attributes on property value. *Real Estate Management and Valuation*. 2020, 28(4), 33-47 p. ISSN 2300-5289.
11. Hromada, E.: Decision-support tools and assessment methods. *Sustainable Building and Refurbishment for Next Generations*. 2013, 669-672 p.
12. Hromada, E.: Real estate valuation using data mining software. *5th Creative Construction Conference (CCC 2016)*. 2016, 284-291 p.
13. Jilemnicka, L., Berka, V., Hromada, E.: Development of Real Estate Market in the Czech Republic. *Acta Polytechnica*. 2008, 48(5), 9-13 p.
14. Krulický, T., Horák, J.: Real estate as an investment asset. *SHS Web of Conferences: Innovative Economic Symposium 2018 - Milestones and Trends of World Economy (IES2018)*. 2019.
15. Krulický, T., Vrbka, J., Brabenec, T.: A relationship between the value of the whole and separate parts. *IOP Conference Series: Materials Science and Engineering*. 2020.
16. Kucharska-Stasiak, E., Olbińska, K.: Reflecting sustainability in property valuation-defining the problem. *Real Estate Management and Valuation*. 2018, 26(2), 60-70 p. ISSN 2300-5289.
17. Kucharska-Stasiak, E.: Reproduction of real estate valuation methodology in practice. An attempt at identifying sources of divergences. *Real Estate Management and Valuation*. 2014, 22(2), 67-79 p. ISSN 2300-5289.
18. Kutasi, D., Badics, M. C.: Valuation methods for the housing market: evidence from Budapest. *Acta Oeconomica*. 2016, 66(3), 527-546 p. ISSN 0001-6373.
19. Meszek, W.: Property valuation under uncertainty. Simulation vs strategic model. *International Journal of Strategic Property Management*. 2013, 17(1), 79-92 p. ISSN 1648-715X.
20. Small, G., Vail, M., Akbar, D.: Property values and regional economic vitality: valuation methods as an indicator of property market behaviour. *Australian Journal of Regional Studies*. 2016, 22(2), 285-306. ISSN 1030-7923.
21. Tajani, F., Morano, P., Ntalianis, K.: Automated valuation models for real estate portfolios: a method for the value updates of the property assets. *Journal of Property Investment and Finance*. 2018, 36(4), 324-347 p. ISSN 1463-578X.
22. Tajani, F., Morano, P., Salvo, F., De Ruggiero, M.: Property valuation: the market approach optimised by a weighted appraisal model. *Journal of Property Investment and Finance*. 2019, 38(5), 399-418 p. ISSN 1463-578X.
23. Vrbka, J., Junga, P., Krulický T. (2019): Methodology for Determining the Rate of Return on Rental of Built-up Land. *Ad Alta-Journal of Interdisciplinary Research*, 9(2), 364-370. ISSN 1804-7890.
24. Vrbka, J., Krulický, T., Brabenec, T., Hejda, J.: Determining the increase in a building's appreciation rate due to a reconstruction. *Sustainability*. 2020, 12(18). ISSN 2071-1050.

Primary Paper Section: A

Secondary Paper Section: AH, AE

ORIGINS OF MEDICAL EDUCATION ON THE TERRITORY OF MODERN UKRAINE

^aALLA KULICHENKO, ^bMARYNA BOICHENKO

^aZaporizhzhia State Medical University, 26 Maiakovskoho Av., Zaporizhzhia, Ukraine 69035.

^bSumy State Pedagogical University named after A. S. Makarenko, 87 Romenska Str., Sumy, Ukraine 40002.
email: ^aalla.kulichenko@gmail.com, ^bmarinaver18@gmail.com

Abstract: The article deals with the origins of Ukrainian medical education during two historical periods – the period of Proto-Slavic medicine (6th century BC – 7th century AD) and the period of folk, secular and monastic medicine of the Kyivan Rus (9th – 13th centuries AD). There are the following methods, applied in the research: content analysis and generalization of references, method of historical reconstruction, and cultural and historical method. The period of Proto-Slavic medicine is characterized as the beginning of the activity of healers, fortune-tellers, priests, magicians, midwives, who combined the rational things with the irrational ones. In the period of folk, secular, and monastic medicine of the Kyivan Rus there was a combination of pagan and Byzantine ideas in all spheres of life.

Keywords: development, folk medicine, medical education, monastic medicine, Proto-Slavic medicine, secular medicine, Ukraine.

1 Introduction

Medicine and medical education are always linked to one another, because all medical manipulations, treatment processes need to be contemplated, and therefore memorized, learned, experimented, concluded, etc. So, there is a classic combination of theory and practice.

Besides, in this article, we will consider that education is the transfer of accumulated values and knowledge of any society, where the environment and all activities are elements of the educational process and the representatives of the older generation are teachers (Education, 2020).

It is worth mentioning that the history of modern Ukraine dates back to ancient times with many cultures and many peoples interwoven at different stages. Thus, we will describe medicine and, accordingly, medical education in the Proto-Slavic period (6th century BC – 7th century AD) and at the age of the Kyivan Rus (9th – 13th centuries AD), using the given principle.

2 Methods

There are the following methods in the research: (i) *content analysis and generalization of historical, literary, and pedagogical sources* – to present a holistic picture of the origins of Ukrainian medical education during the period of Proto-Slavic medicine (6th century BC – 7th century AD) and the period of folk, secular and monastic medicine of the Kyivan Rus (9th – 13th centuries AD); (ii) *method of historical reconstruction* – to create a periodization of the origins of Ukrainian medical education and to reconstruct logically historical events; (iii) *cultural and historical method* – to clarify the specific features of the development of medicine and medical education in the mentioned chronological periods.

3 Results and discussion

3.1 Origins of Ukrainian medical education. Proto-Slavic medicine (6th century BC – 7th century AD)

During the Chalcolithic Age, in the 6th – 4th centuries BC, the Proto-Slavic society, which lived in the eastern half of the great Slavic homeland, reached a higher stage of development (Mirskii & Bogoiavlenskii, 2018). At that time, the Trypillia tribes and Scythians lived in the territory of modern Ukraine, whose medical practice was crucial among all other nations.

The Trypillia tribes settled from the Carpathians to the left bank of the middle Dnipro and from Volhynia to the lower reaches of the Danube and the northern coast of the Black Sea. Trypillia tribes paid special attention to the sick treatment, and children care. Ye. Palamarchuk and I. Andrievskiy point out that “the

centuries-old experience of Trypillia medicine made it possible to correlate changes in the body with external changes and to make whole “portraits” of diseases. Trypillians, like our contemporaries, suffered mainly from the stomach, kidneys, heart diseases as well as from cold and so on. The people from Trypillia tribes also knew about the surgery” (Palamarchuk & Andrievskiy, 2005).

As the Trypillians were intensively engaged in agriculture and cattle breeding, they used plants and animal parts during the treatment of the sick. Shamans, magicians, and healers made infusions, decoctions, ointments, protective amulets, and medallions. They also appealed to the spirits of their ancestors with the help of certain rituals and words, because for Trypillians magic made it possible to put religion into practice. Besides, only selected representatives of the Trypillia tribes had medical knowledge. Sometimes the medicine of the Trypillians and Scythians was intertwined.

The Scythians established Scythia, “a Proto-Slavic state located in the area from the Caspian Sea along the northern Black Sea coast to the Carpathians. Witnesses of the greatness of Scythia are numerous mounds throughout Ukraine – the burial places of leaders” (Blikhar, 2004), as well as Greek chroniclers, who have retained information about the life and work of the Scythians. Scythia became a large state in the northern Black Sea region, which was the sphere of interests of the Mediterranean world (Blikhar, 2004).

The arsenal of medicines was considerable in Scythia. The Scythians used mostly herbal drugs. Scythian healers distinguished poisonous plants from harmless ones that they used for food. Scythian midwives helped mothers with children and accumulated knowledge and skills from generation to generation. Also, Scythian healers were familiar with enema accessories, massage, cold and hot treatments (Blikhar, 2004), for example, the so-called “Scythian baths”. The Scythians used hemp seeds and, covered with clothes, threw them on hot stones; at once it formed a steam, and the Scythians were shouting in delight, and the steam was instead of a water bath (The History, 2020). Besides, the Scythians used unique methods of mummification, when the royals died.

Magicians, sorcerers, and sacrificers treated the Scythians. However, they applied an irrational rather than a rational principle, in many cases, their treatments were unsuccessful, and patients died in agony. Herodotus wrote that “Scythia has many magicians who predict the future with the help of willow sticks. A large bundle of these sticks is brought and placed on the ground. The magician unties the bundle and puts each stick while uttering his prophecy: then, while he is still speaking, he gathers the sticks and puts them back in the bundle” (The History, 2020). In most cases, this ritual predicted the consequences of the disease – either recovery or death.

In the treatise “Air, Waters, and Places”, authored by the father of medicine Hippocrates, there is a mention of the Scythians as stable, strong and cruel people, and a description of various medical painful manipulations during illness – “horseback riding, during which the legs are constantly hanging on the sides of the horse, causes tumours; then during the strong development of this disease, there is a sprain of the thighs and lameness. The Scythians treat them as follows: at the first signs of the disease they cut on both sides of the veins behind the ears; when the bleeding stops, patients with weakness fall asleep; then some patients wake up healthy, others do not. It seems that this method of treatment has a detrimental effect on the seminal fluid: there are veins near the ears, as a result of which the persons who have had this operation become incapable of fertilization...” (Hippocrates, 1947).

As for the existence of medical schools, M. Mirskiy and N. Bohoiavlenskyy joined to the statement of M. Dumka that in

the mixed Greco-Scythian settlements and some regions of Scythia, young people liked medicine and were even engaged in medical circles. Moreover, Scythian healers and magicians taught not only their relatives but also strangers for a fee (Mirskii & Bogoiavlenskii, 2018).

After the Scythians, the Sarmatians, Goths, and Huns lived in the territory of modern Ukraine. Healers or magicians continued to provide medical care, using herbal medicine, and turning to their deities.

S. Skolozdra and B. Tchaikovskiy emphasize that “the arrival of Slavs during the 6th – 7th centuries AD appears so sudden and ubiquitous that in historical literature it is sometimes called the silent Slavic revolution. <...> However, it should be considered that a single people called “Slavs” never existed, and the collective term “Slavs” is now used to denote a set of tribes, each of which had its origin and history” (Skolozdra & Tchaikovskiy, 2011).

In the 6th century, in the middle of the Dnipro, Slavic tribes formed a powerful union. It included Poliany, Drevliany, Kryvychi, Radymychi, Severiany, and others. These peoples united around Kyiv and became known as Ros or Rus (Mirskii & Bogoiavlenskii, 2018).

The Slavs worshipped the gods, and therefore the healing and transmission of medical knowledge were also associated with pagan rituals and beliefs. Thus, the famous Ukrainian folklorist M. Kostomarov noted that “the Slavs thought that the deity Alive (Zhyvyi) had turned into a cuckoo to announce the time of year and longevity to people. Therefore, sacrifices were especially offered to him; when people first heard the cuckoo forging in the spring, they asked how many years to live, and determined the number of future years by how many times the bird forged after the question” (Kostomarov, 1994).

The Slavs appealed to magicians, fortune-tellers, healers, and sorcerers. Since medicine was magic for them, the knowledge of herbs was a miracle. The people naively believed that the power inherent in herbs was as healing as the power of whispering, and inspiring, with the help of which one could heal a person and send disease on him, protect him from danger, and even kill him. Usually, the patient went to the healer for medication against the disease. He did not ask about a higher being or power that, through the healer, gave power to medicine. In this case, there was faith in the power of the thing itself (Kostomarov, 1994).

Besides, the Slavic tribes respected plants, animals, and flowers, which were not only medicinal ones. They also symbolized specific states of health. For example, according to the beliefs of the Slavs, maple had a mysterious healing power. M. Kostomarov stated that “the Kupala Night was of great importance for the Slavs. On this holiday, the Slavs were collecting herbs, both medicinal and those to which the imagination gave healing power. They also considered water, fire, and wreaths from the Kupala holiday to be healthy. On that Night they could find some charcoal under the mugwort, which cured diseases” (Kostomarov, 1994).

So, the Slavic tribes that lived around Kyiv and throughout modern Ukraine had laid the foundations for “folk medicine”.

3.2 Origins of Ukrainian medical education. Folk, secular and monastic medicine of the Kyivan Rus (9th – 13th centuries AD).

Ancient Rus stretched from the Baltic Sea to the Black Sea and from the Western Bug to the Volga. In the Middle Ages, it became one of the important states, which was founded in the 9th century instead of small principalities. The Kyivan Rus quickly became a powerful territory with a unique culture and medicine (Mirskii & Bogoiavlenskii, 2018).

From the beginning of its establishment, the Kyivan Rus was pagan with the beliefs and ideas of the Slavic tribes. L. Zmieiev

argued that “neither Olha, who went to Constantinople, nor the Greek Princess Anna, Volodymyr’s fiancée, nor later Metropolitan Yefrem, the eunuch from Mount Athos, brought with them or called Greek doctors” (Zmeev, 1896). Since the inhabitants of the Kyivan Rus, firstly, did not like to be treated. Secondly, they had a sufficient number of pagan doctors (magicians, healers, midwives, etc.). Thirdly, people often sought help from surgeons during the war and with domestic injuries (Zmeev, 1896).

Pagan doctors transferred knowledge to pupils at home, where they were treating patients. According to L. Zmieiev, “the method of teaching medicine was usually ancient and practical. <...> There was a hereditary transfer of theoretical and practical knowledge from teacher to assistant, pupil, as well as the right for free independent practice after a certain exam before the teacher. The first place was for surgical knowledge, and women and children were at the last one” (Zmeev, 1896).

O. Viesielkova notes that “folk medicine used knowledge passed down from generation to generation. Thus, there were family medical schools, which existed until the 17th – 18th centuries. However, there was no clear training program for future doctors, and the acquired medical knowledge and experience had a spontaneous and empirical meaning” (Veselkova, 2018). Folk medicine showed folk ideas about human anatomy and physiology, folk understanding of the origin of diseases, methods of diagnosis and prevention, sanitation, classification of drugs, a combination of rational and irrational principles (Ivashchenko, 2012).

One of such doctors was Ivan Smera, a Cuman (Polovtsian), who served Volodymyr the Great. He was probably the son of a man close to the prince, mastered the craft of medicine abroad, first studying it in the Kyivan Rus (Zmeev, 1896). Thus, Ivan Smera was one of the first secular doctors.

However, M. Mirskiy and N. Bohoiavlenskii believe that “Smera could be a magician (healer, folk doctor), i.e. a representative of folk medicine, and, of course, a great specialist, otherwise he would not have become a doctor of Volodymyr the Great. Also, he was a pagan and accepted Christianity only during a trip to Egypt. Therefore, this study of medicine (for example, in Byzantium) and acquaintance with the achievements of ancient medicine were hardly available to him before. He did not work in monastic hospitals because they did not exist then” (Mirskii & Bogoiavlenskii, 2018).

L. Zmieiev provided us with information concerning the absence of hospitals in the pre-Christian Kyivan Rus. He wrote that “medical establishments, during the time of Volodymyr the Great, could not appear quickly. Although the existence, for example, according to the Norwegian saga, of Princess Olha’s hospital cannot be ruled out” (Zmeev, 1896).

After the official baptism of the Kyivan Rus by Volodymyr the Great in 988, Christian churches and monasteries began to be actively built. Thus, in 1051, the Pechersk Monastery (now known as the Kyiv Pechersk Lavra), one of the first Christian monasteries of the then Kyivan Rus and one of the oldest historical and cultural monuments of modern Ukraine, was founded by Antonii Pecherskyi (983 – 1073). I. Zhylenko argues that “the establishment of such a monastery was not just a natural result of the Baptism of Ukraine, it was necessary for its further spiritual progress” (Zhylenko, 2001).

According to historical records, the doctor and founder of the Pechersk Monastery, Anthonii decided to “choose a place in three layers (approximately 3200 m. – A. K., M. B.) from Kyiv down the Dnipro, on its high bank and settled in a cave dug for secret exploits and prayers by Illarion, the priest of the Berestiv village” (Kiyev-Pecherskaya...1909, Kolpakova, 2001). In 1055 – 1056 Feodosii (1008 or 1036 – 1074), later abbot of the Pechersk Monastery (Kiyev-Pecherskaya..., 1909), joined Anthonii.

In the 11th century, the Pechersk monastery was the birthplace of monastic medicine. In the 11th century also there were the first "monastic hospitals. The Nikon Chronicle proved that in 1091 Metropolitan Yefrem built a hospital in Pereiaslav" (Marchukova, 2003). A feature of monastic medicine was the combination of experience of folk healers and medical knowledge from the Byzantine state. Thus, most monks who provided medical care in the monasteries were from family medical schools (Veselkova, 2018).

With the first monastic hospitals, everyone could visit the monks-doctors (healers): from wealthy to ordinary people. Because in the new "Christian culture" there was the idea that God punished the sinner with diseases or sent trials to the righteous, reminding both of them of the transiency of human life" (Marchukova, 2003). So the only way out was to turn to prayers and monks who could help people. Mentions of treatment in the Pechersk monastery are recorded in the Kyivan Cave Patericon (13th century), a collection of stories about the establishment of the Pechersk monastery and the life of the first monks in it. M. Dzeman states that "regarding the development of medical knowledge, it should be noted that the monastic medicine of the Kyivan Rus followed the tradition of the healing process in a threefold combination – soul, spirit, and body" (Dzeman, 2018).

Thus, the founder of the monastery, Anthonii "healed the sick with his food, and they believed that they were given a medicinal spell, but were healed by his prayers" (Kolpakova, 2001). Anthonii had a pupil whose name was Ahapit (? – 1095). The Kyivan Cave Patericon states that "if whoever was sick from the fraternity, he left his cell and came to his sick brother and served him, lifting and helping him, carrying him in his arms, and giving him boiled vegetables and the sick man was healed by his prayers. If his illness continued, Ahapit stayed with him incessantly, praying for him continuously, until the Lord gave health to the sick for his prayers. So, because of this, he was called a physician because the Lord had given him the gift of healing. And they heard about him in the city, that there was a doctor in the monastery, and many patients came to him and recovered" (Kolpakova, 2001).

Besides, in the 11th century, there were secular doctors, who usually studied medicine in foreign countries or had a different religion, living in the Kyivan Rus. The Christian church did not influence such doctors. Among the secular doctors, some served princes, participated in military campaigns, and did not pay taxes for their medical activities. Secular doctors often visited the sick and got money for it. They examined patients, and then either prescribed specific drugs or predicted death. Their medical practice in most cases was not successful, because patients died without the necessary treatment and care. The researchers note, "The salary received by secular doctors was probably significant: in any case, in the chronicles, there were frequent complaints about the high cost of treatment and yet no effect from treatment" (Mirskii & Bogoiavlenskii, 2018). During the time of Ahapit, a secular physician Armenian lived. He was also famous in the Kyivan Rus.

An Armenian once prophesied death to Prince Vsevolod: "An Armenian despaired him, predicting his death eight days later. The blessed Ahapit gave him the vegetables he ate and healed him. And the fame of him spread throughout the land" (Kolpakova, 2001). The Armenian became jealous of Ahapit and once sent to him "a man sentenced to death, ordering him to give Ahapit a poisonous drink so that he would fall dead before consuming it. The blessed Ahapit, seeing this, gave him monastic food and healed him with his prayers, and saved the prisoner from death" (Kolpakova, 2001).

Another prime example in favour of monastic medicine deals with the illness of Volodymyr Monomakh, Prince of Chernihiv. The Armenian again failed to cure the sick Prince and even exacerbated the disease. Ahapit helped again by sending the Prince healing vegetables, which he ate. Volodymyr Monomakh then recovered (Kolpakova, 2001).

Later, Ahapit became very ill, and "the Armenian visited him. He began to argue with Ahapit about the art of healing, talking about which drinks were used to treat different diseases. The blessed Ahapit answered, "To whom the Lord will give health". And the Armenian realized that he didn't know how to treat the sick. <...> And here they brought a patient from Kyiv. Ahapit got up, as if not sick, took the vegetables he ate, showed them to the doctor, saying, "This is medicine! Understand and see!" However, the doctor replied to the monk, "This is not our medicine, but I think it is brought from Alexandria". The Blessed Ahapit laughed at his ignorance, gave the potion to the sick man, and healed him" (Kolpakova, 2001).

This medical discussion between Ahapit and the Armenian could be seen as a manifestation of a kind of competition between monastic and secular doctors. Since services of monastic doctors were free of charge, and secular ones, as mentioned, were fee-paying (Mirskii & Bogoiavlenskii, 2018).

Among other famous monks, there were also Damian (? – 1071) and Hryhorii (? – 1093), who "resorted to prayers, and for this, he defeated the demons" (Kolpakova, 2001), i.e., treated the mental disorders.

In "The Lives of the Saints" (1689) Dmytro of Rostov described Damian as follows, "with humility and obedience, considering himself unworthy of the gift of healing, Damian then performed painful prayers and anointed the sick with oil, and, by God's grace, all received healing and went healthy" (Zhiytiya svyatykh na ..., 2004).

The icon painter Alimprii (1065 – 1114) could also treat the sick. The Kyivan Cave Patericon states that "one of the rich people of Kyiv suffered from leprosy and was treated by many magicians and doctors, he even sought help from people of other religions and did not recover, but only healed, and one of his friends forced him to go to the Pechersk monastery and ask some fathers to pray for him. He was brought to the monastery, the abbot ordered him to drink from the well of St. Feodosii, and his head and face were anointed with that water. <...> Alimprii, on the other hand, painted his face with artistic paint and smeared purulent scabs, and thus returned it to its first good appearance. He brought him to the Divine Church of Pechersk, allowed him to partake of the Holy Mysteries, and ordered him to wash with the water where the priests wash up. His scabs immediately disappeared, and he was healed of his illness" (Kolpakova, 2001).

In 1106, Mykola Sviatosha (1080 – 1143), Prince of Chernihiv, built a hospital monastery (Kiyev-Pecherskaya..., 1909). Besides, the Prince had a secular doctor Petro Siriianyn. However, Petro Siriianyn's methods of treatment were not successful. Once upon a time, the Prince was sick. Before the doctor's arrival, the Prince recovered, not allowing himself to be treated. And it happened more than once. One day Petro fell ill and Sviatosha sent to him such a message, "If you don't drink the potion, you'll recover soon. If you don't listen to me, you'll suffer a lot". As a result, Petro was healed by Sviatosha's prayers. When he fell ill again, Sviatosha sent to tell him, "You will recover in 3 days if you are not treated". Thus, Petro Siriianyn obeyed him and recovered in three days.... (Kolpakova, 2001).

Being in the monastery, Mykola Sviatosha predicted the death of his doctor. However, Petro Siriianyn understood that the Prince was prophesying his own death. He asked, "Please, could you describe to me, your servant, a deadly disease? And if I do not cure it, then my head will be for your head, and my soul will be for your soul!" (Kolpakova, 2001). Sviatosha replied, "I did not need treatment during my life, neither the dead can see life again nor doctors can resurrect" (Kolpakova, 2001).

In the Kyivan Cave Patericon, there is a brief mention of another healer Pymen (? – 1114), who has healed the sick and foreseen the future (Kolpakova, 2001).

It is worth mentioning that the process of treatment by the first monks both in the Kyivan Cave Patericon" and "The Lives of the Saints" by St. Dmytro of Rostov is described as "a spiritual service. The ability to heal people was a gift of God, revealed to the righteous people for their spiritual feat, and healing was an integral part of serving the Lord" (Dzeman, 2018). The number of the first monk-doctors was small; otherwise, there would be more mentions in historical chronicles.

In the first monastic hospitals on the territory of modern Ukraine, monks had to follow certain rules, in particular, they had to do the hardest work while caring for the sick; be tolerant in their treatment; not to worry about personal enrichment, etc. The monks were not only doctors but also educators, because "they kept manuscripts, engaged in the translation of Greek and Latin books with medical content. At the same time, they enriched them with their knowledge" (Marchukova, 2003). However, M. Mirskiy and N. Bohoiavlenskiy argue in this regard and note that "the main occupation of the monks, although they were representatives of intellectual culture, was most likely not the study and copying of ancient literature (and especially not the healing of the sick), but theology which absorbed the main intellectual intentions of the clergy. The heroism of unknown monks who devoted themselves to charitable activities during the treatment of the sick and suffering deserved more respect" (Mirskii & Bogoiavlenskii, 2018).

Besides, there were "Svyatoslav's Collection" (Izbornyk Svyatoslava) (1073) and "Svyatoslav's Collection" (1076), the fundamental encyclopedic works of the Kyivan Rus connected with various spheres of human life. These works were translations from Bulgarian. As for medicine, these "Collections" are the first textbooks, which described certain diseases, the algorithm of their treatment, recommendations for proper nutrition (vegetables, fruits, cereals, fish, etc.), ways to prevent diseases. Moreover, there was information about physicians and surgeons of that time.

Women of the Kyivan Rus were also interested in medicine. According to the canonical version, the first prominent woman-doctor and the first medical scientist in the history of Rus-Ukraine was Dobrodiia-Yevpraksiia-Zoia (1108 – 1172), the daughter of the Grand Duke of Kyiv Mstyslav and granddaughter of Volodymyr Monomakh, great-granddaughter of Yaroslav the Wise. In her youth, Princess Yevpraksiia got involved with folk medicine. She collected medicinal herbs, prepared infusions, and treated both the nobility and the common people. For this, she was sometimes considered to be a witch. After marriage and moving to Byzantium, in the 30s of the 12th century Yevpraksiia wrote a scientific work "Alima" (Ointments) in Greek. The treatise included 5 parts and 29 chapters. The work became quite popular in the Middle Ages because it combined Yevpraksiia's medical practice and analysis of other physicians' activity (Kitsera, & Kitsera, 2010).

However, as O. Tkachivska notes, "today there are not enough facts to claim that the author of the first domestic medical work "Alima" (Ointments), written in Greek, was the Kyivan princess Zoia Mstyslavivna" (Tkachivska, 2009). The discussion of the early 20th century, initiated by H. Loparev (1902) and S. Papadimitriou (1904), was continued in the 1970s by G. Litavrin, who investigated fragments of treatise photocopies. He stated that "we have a collection of medical tips, which are of a practical purpose – to be a guide for doctors, a kind of medical encyclopedia, a part is, perhaps, a compilation, another part is original (let the experts decide). It was made by a practitioner who did not refrain from his remarks, offering his methods of treatment..." (Litavrin, 1971). This fragment of the translation deals with the basics of healthy eating; internal organs, infectious diseases, chronic diseases, and their treatment; elements of anatomy; pregnancy, a post-natal period for women and newborns, etc. (Litavrin, 1971).

O. Viesielkova notes that "until the 17th century, medical service developed spontaneously, without state influence; there even was no state system of training doctors" (Veselkova, 2018).

L. Zmieiev pointed out that "monasteries did not teach medicine as a speciality and therefore could not influence the formation of medical staff" (Zmeev, 1896). M. Dzeman also adds that "in the 10th – 12th centuries the foundation of centres for mass medical care and schools for the broad training of doctors, according to modern ideas, was simply impossible for technical reasons" (Dzeman, 2018).

However, "The Church Statute of Prince Volodymyr" (10th century), which was one of the first official documents regulating specific state issues, referred to *lichsi* (doctors) who belonged to the ecclesiastical people (Cherepnin, 1976). Thus, this statute applied only to monastic medicine. Doctors approved by the church were to ensure that newborns were baptized and those who died were confessed and buried according to Christian ritual (Zmeev, 1896). "The True Russian" (11th century), another state document, also mentioned secular medicine. In particular, paragraph 30 states that "If someone damages a person with a sword but does not kill, he will pay 3 hryvnias, and a hryvnia will go to the victim for a wound for treatment..." (Grekov, 1940).

Despite the development of monastic and secular medicine in the Kyivan Rus, folk medicine continued to exist, guided by moral and ethical principles.

Speaking of the first school in the Kyivan Rus, I. Ohienko mentions the name of its founder, Princess Anna Vsevolodivna (second half of the 11th century – 1112 (3)), and points out that "in 1086 Anna or Yanka laid in her monastery the first girls' school, accepted all girls who wanted to study. However, there was no information in the chronicles about Anna's school, only about the monastery, which was often identified with the school of that time" (Ohienko, 2003). Apparently, in this school, the girls were taught not only the fine arts of the time but also household items, among which there were the basics of medicine. Therefore, there are reasons to consider this establishment a prototype of medical educational ones.

In the 13th century, the development of medicine, and hence the transfer of medical knowledge, was reduced because of the Tatar and Mongol invasion in 1238 – 1240. It, on the contrary, slowed down the life of the Kyivan Rus, dividing it territorially.

4 Conclusions

Thus, many peoples lived on the territory of modern Ukraine at different times. They left a noticeable mark in the development of medicine and, accordingly, medical education. The study has found out that the origins of Ukrainian medical education are the period of Proto-Slavic medicine (6th century BC – 7th century AD) and the period of folk, secular and monastic medicine of the Kyivan Rus (9th – 13th centuries AD).

The period of Proto-Slavic medicine is the beginning of the activity of healers, fortune-tellers, priests, magicians, midwives, who could combine the rational things with the irrational ones, i.e. they used animate and inanimate nature and the power of words. There were two categories of so-called "specialists" which correspond to contemporary "general practitioners" and "surgeons". Medical knowledge and experience were transmitted from generation to generation, sometimes people paid for it. Besides, the first medical circles were established during the Scythian time on the territory of modern Ukraine.

In the period of folk, secular, and monastic medicine of the Kyivan Rus there was a combination of pagan and Byzantine ideas in all spheres of life. Firstly, there were monasteries, mostly with hospitals and monks-doctors who used prayers and special methods of treatment. Secondly, wealthy people had doctors who either studied medicine in other countries (Egypt, Greece, Byzantium) or were of foreign origin. Thirdly, folk (pagan) medicine continued to develop. It should be noted that there was a kind of competition between these three areas. As for medical education, the representatives of folk medicine continued to pass on knowledge from generation to generation,

sometimes for a fee; the monks combined the principles of folk medicine with the achievements of foreign colleagues, teaching those who decided to join them. Also, both monks and secular physicians attempted to translate and create their treatises, which were the first textbooks in medicine and pharmacology. Although the mass establishment of medical schools during the Kyivan Rus did not take place, however, we should talk about the school of Princess Anna Vsevolodivna, as one of the earliest establishments of medical education in Ukraine.

Literature:

1. Education | Definition, Development, History, Types, & Facts [Internet]. Encyclopedia Britannica. 2020 [cited 3 Dec 2020]. Available from: <https://www.britannica.com/topic/education>.
2. Mirskii, M., & Bogoïavlenskii, N.: *Meditsina Drevnei Rusi [Medicine of Ancient Rus]*. Moscow: Rodina, 2018. 416 p. ISBN 978-5-907024-14-4.
3. Palamarchuk, Ye., & Andriievskiy, I.: *Zori Trypillia [Trypillia Stars]*. 2nd ed. Vinnytsia: Teza, 2005. 132 p. ISBN 966-8317-54-8.
4. Blikhar, Ye.: *Pro medytsynu skifiv [About the medicine of the Scythians]*. Vol. 1. Collection of works Ternopil branch of the Scientific Shevchenko Society, 2004. p.172-176.
5. The History, vol. 2 | Online Library of Liberty [Internet]. Oll.libertyfund.org. 2020 [cited 10 Dec 2020]. Available from: https://oll.libertyfund.org/title/the-history-vol-2#f1300-02_labe_1_240
6. Hippocrates: *O vozdukhe, vodakh i mestnostyakh [Air, Waters and Places]*. [In Russian]. Trans Latyshev VV. Vol. 2. Bulletin of Ancient History, 1947. p. 294-298.
7. Skolozdra, S.V., & Tchaikovskiy, B.P.: *Natsionalna ideia yak skladova Bolonskoho protsesu [National idea as a component of the Bologna process]*. Vol. 13(3). Scientific Bulletin of Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies Lviv, 2011. p. 270-277.
8. Kostomarov, M.I.: *Slovianska mifolohiia [Slavic mythology]*. Kyiv: Lybid, 1994. 384 p. ISBN 5-325-00183-3.
9. Zmeev, L.F.: *Chteniya po vrachebnoy istorii Rossii [Readings on the medical history of Russia]*. St. Petersburg: Printing house of Demakov V.F., 1896. 264 p. ISBN 9785998994579.
10. Veselkova, E.G.: *Meditsinskoye obrazovaniye v Rossii: istoriya, sovremennoye sostoyaniye, printsipy [Medical education in Russia: history, current state, principles]*. [Internet]. Vol. 3. Pedagogy of professional medical education, 2018. ISSN 2686-7176. [cited 23 Dec 2020]. Available from: https://www.profmedobr.ru/wp-content/uploads/2018/12/03-2018-%D0%92%D0%B5%D1%81%D0%B5%D0%BB%D0%BA%D0%BE%D0%B2%D0%B0-06-14_.pdf.
11. Ivashchenko, I.Y.: *Ukrayinska narodna medytsyna [Ukrainian folk medicine]*. Vol. 1. Nursing, 2012. P. 23-28.
12. Zhylenko, I.: *Slovo do chytacha. Dzherela ta istoriia tekstu Pecherskoho pateryka [A word to the reader. Sources and history of the text of the Pechersk Patericon]*. In Kolpakova, V.M., ed.: *Pateryk Kyievo-Pecherskyy [The Kyivan Cave Patericon]* [Internet]. 2nd ed. Kyiv: Publishing House "KM Academy", 2001. 348 p. [cited 20 Dec 2020]. Available from: <http://izbornyk.org.ua/paterikon/paterikon.htm>.
13. *Kyievo-Pecherskaya Lavra [The Kyiv Pechersk Lavra]*. Kyiv: Printing House of the Kyiv Pechersk Lavra, 1909. 31 p.
14. Kolpakova, V.M., ed.: *Pateryk Kyievo-Pecherskyy [The Kyivan Cave Patericon]* [Internet]. 2nd ed. Kyiv: Publishing House "KM Academy", 2001. 348 p. [cited 20 Dec 2020]. Available from: <http://izbornyk.org.ua/paterikon/paterikon.htm>
15. Marchukova, S.M.: *Meditsina v zerkale istorii [Medicine in the mirror of history]*. Moscow: European House, 2003. 272 p. ISBN 5-8015-0151-7.
16. Dzeman, M.L.: *Do 100-richchya zasnuvannia Natsionalnoyi akademiyi nauk Ukrainy: aktsentovani pytannia v dyskursi evolyutsiyi medychnykh piznan ukraintsev (2-he podannya) [To the 100th anniversary of the National Academy of Sciences of Ukraine foundation: highlighted issues within the discourse of the medical knowledge evolution of Ukrainians (2nd submission)]*. Vol. 7 (4). Practical doctor, 2018. p. 53-70. ISSN 2413-5461.
17. Zhitiya svyatykh na russkom yazyke, izlozhennyye po rukovodstvu Chetikh-Miney sv. Dimitriya Rostovskogo [The Lives of the Saints in Russian, set out according to the leadership of the Chetikh-Minea by St. Dimitri Rostovsky]. Vol. II. October. Kiev: Holy Dormition Kiev-Pechersk Lavra, 2004. p. 260-311.
18. Kitsera, N.I., & Kitsera O.O.: *Dobrodiia-Yevpraksiia Mstyslavivna – persha zhinka-likar v istoriyi Rusi-Ukrayiny [Dobrodiia-Yevpraksiia Mstyslavivna – the first woman-doctor in the history of Rus-Ukraine]*. Vol. 1. Female doctor: a scientific-practical view for practitioners, 2010. p. 49-50.
19. Tkachivska, O.: *Yevpraksiia-Zoia i medychnyy traktat "Mazi" [Evpraksiia-Zoia and medical treatise "Ointments"]*. Vol. XXIV: Medical collection. Medicine and biology. Proceedings of the Scientific Society named after Shevchenko, 2009. p. 51-56.
20. Litavrin, G.G.: *Vizantiyskiy meditsinskiy traktat XI-XIV vv. [Byzantine medical treatise of the 11th – 14th centuries]*. Vol. 31 (56). Byzantine Calendar, 1971. p. 249-301.
21. Cherepnin, L.V., ed.: *Ustav knyazyza Vladimira o desyatynakh. Drevnerusskiye knyazheskiye ustavy XI-XV vv. [Church Statute of Prince Vladimir. Ancient Russian princes of the 11th – 15th centuries]*. Moscow: Nauka, 1976. 240 p.
22. Grekov, B.D., ed.: *Pravda Russkaya [True Russian]*. Vol. 1. M.; L.: Publishing house of the Academy of Sciences of the USSR; 1940. 505 p.
23. Ohiienko, I.: *Kniahynia Yanka – zasnovnytsia pershoyi zhinochoyi shkoly khudozhnikh remesel u Kyievi [Princess Yanka – the founder of the first girls' school of arts and crafts in Kyiv]*. Vol. 1-2. People, creativity, and ethnography, 2003. p. 63-70. ISSN 01306936.

Primary Paper Section: A

Secondary Paper Section: AB, AM

BEST PRACTICES FOR IMPROVING SPATIAL IMAGINATION IN MATHEMATICS

^aZUZANA NAGYOVÁ LEHOCKÁ, ^bANTAL CSÁKY
^cRASTISLAV ŽITNÝ

*Constantine the Philosopher University in Nitra, Tr. A. Hlinku 1,
94901, Nitra, Slovakia*

email: ^aznlehecka@ukf.sk, ^bacsaky@ukf.sk, ^czitimy@ukf.sk

Paper is published within project KEGA 015UKF-4/2020 Development spatial abilities of 10-12-year-old students.

Abstract: In this study, we collected best practices and tools for the development of spatial imagination. We divided tools into 3 groups: planar aids, spatial aids, and board games. In the case of planar aids, we present the Tangram puzzle, the Geoboard, the Indian mosaic and the Poliomino. As for spatial aids, we analysed the Polydron, the Geomag, Pop-up projects, the Zometoll, the 4D Frame, and the Jomili as suitable development tools. It is difficult to find a suitable development game among board games, because they are explored insufficiently. We recommend four games, the Ubongo, the Q-bitz, the Rumis and the Blokus. In this study we would like to eliminate the shortcomings in the teaching of mathematics, because these best practices, which develop spatial imagination, are not sufficiently known in Slovakia.

Keywords: Spatial Imagination, Manipulation, Game, Collection, Development.

1 Introduction

Developing the spatial imagination of schoolchildren is an important task in the educational process, especially with regard of the practical application of acquired competencies in real life. Spatial imagination is “the sum of abilities related to reproductive and anticipatory, static and dynamic ideas about shapes, their properties and mutual relations between geometric shapes in space” (Molnár, 2004, p. 7). J. Piaget and V. Repáš state that “there are certain time periods that are particularly favourable for the development of spatial imagination. When these periods are missed, one loses the opportunity to develop his/her abilities to the level given by genetic predispositions” (Hejný et al., 1990, p. 368). Geometric spatial imagination is the ability to perceive

- geometric formations and their shape, dimensions and location in space,
- formations in different positions, different from the original position,
- deformation of dimensions, structure, etc.,
- surface representation and oral description of bodies,
- creating a spatial model based on the image shown in the plane.

Based on the results of research conducted in 2012, it was also proved that the development of spatial imagination is helped by our own experience gained in the development of fine motor skills and psychomotor skills (Gabajová, 2012).

Perný (2004) also deals with the development of spatial imagination, the so-called spontaneous stereometrics, i.e. the creation of basic concepts – ideas about bodies and their properties. He identifies four phenomena that are important for the development of spatial imagination:

1. The language phenomenon – refers to communication, e.g. understanding and verbal determination of the front and back side of the cube, the direction of rolling and the forward and backward movement.
2. The phenomenon of the concreteness of the idea – examines what type of cube model students imagine, e.g. more often they imagine a complete, opaque model than an empty wireframe.
3. Kinaesthetic phenomenon – describes the accompanying movement phenomena that students induced when they solve a problem, e.g. when the cube turns in the mind, whether it is related to the hand movement signal.
4. The phenomenon of the use of regularities – certain regularities occur in certain situations, e.g. the sum of the values on the opposite dice sides equal to 7.

In recent years, the evaluation of spatial imagination has been carried out mainly in the context of STEM (science, technology, engineering, mathematics) and the results confirm their close connection. (Cheng and Mix, 2014; Newcombe, 2013; Uttal and Cohen, 2012).

The manipulation activities applied in the teaching of mathematics should be present at the forefront of teachers' work, as it plays a crucial role in the effective acquisition of knowledge and in the expansion of the range of knowledge. Active cognition develops memory, understanding the context, constructive thinking, individual abilities, positive qualities and ultimately motivates students. Spatial concepts, knowledge and attitudes are formed by the students' own experiences. The construction of various geometric bodies develops spatial imagination as well as constructive thinking of students. The development of manipulative activity in the teaching of mathematics began after the publication of the results of Piaget's research. His research clearly demonstrates: “The content of thinking cannot be considered a static reflection, but should be understood as an active intellectual schema that develops during a particular activity, it is mastered, regenerated by repetition, differentiated, optimized the content, and regenerated.” (Czeglédý and Hajdu, 1982).

In connection with the system and development of cognitive abilities, Nagy (1998) points out that during the creative process and problem solving, a new product will be created, and thus new knowledge. In his study, he defines three inherited forms of knowledge acquisition: (1) exploration, (2) testing, and (3) play. In its interpretation, play essentially represents “simulating behaviour”, “the independence of cognitive competence, which means direct action with signs and symbols” (Nagy, 1998, p. 11). Game could play a more important role in the learning process, as scientists are also showing a growing interest in game-based learning, explore and discover ways in which different types of games can be integrated into the school context. The right game, applied in the right place and at the right time in math class, can make learning easier and more efficient in the long run. It is important to recall Fröbel's pedagogical activity in connection with the introduction of games into the teaching process. In addition to developing a system of gaming devices called “gifts”, he also developed strict instructions and methodological descriptions of their use. “In Fröbel's kindergarten, the acquisition of knowledge did not take place through speech and intellectual exercises, but through the active activity and creation” (Szabolcs and Réthy, 1999, p. 364). Learning is born through games from the integration of play in education, which can significantly increase interest in learning (Chung, Yen-Chih, Yeh and Lou, 2017). Learning by playing provides a new interface for pupils and teachers and increases bias, and motivation to learn. The content of game provides new knowledge, even development of skills is influenced by the gaming the experience itself (McFarlane, Sparrowhawk, and Heald, 2002).

2 Spatial aids

The Polydron geometric construction system is an English invention that has existed for more than 30 years. Technical designer Edward Harvey worked on a project in 1970, laying the foundations for this internationally recognized system. In 1982, Edward Harvey's son founded POLYDRON company, which quickly gained international recognition. Roman Harvey began producing safe, strong and easy-to-use geometric shapes from high-quality plastics. From them it is possible to model two-dimensional and three-dimensional geometric models, which are especially suitable for recognizing the properties of geometric bodies. Older children can use the kit, e.g. for modelling polygons (4-side, 6-side, 8-side, 12-side, 20-side) for modelling other bodies. Modelling of these bodies brings the possibility of new discoveries (Figure 1).

The Geomag is a set that was originally born from an Italian idea and offers geometric modelling for children of all ages. The physical and technical essence of the kit is magnetism. The model of the geometric point is a metal sphere with a diameter of about 1 cm and the straight model is represented by rods of various lengths made of plastic or metal, at the ends of which are placed super strong magnets (Figure 2). It follows from the above that balls and rods can be joined into different planar and spatial shapes. This set is suitable for the development of geometric spatial perception.



Figure 1: Geometric shapes of the Polydron

The experience of Fiala (2013) shows that mathematical education needs to be revived and active learning should be given priority, including in the teaching of geometry. In his research he successfully uses the Geomag, the Zoometole, and the Polydron sets. Previous research has shown that block games are particularly important for the development of spatial skills and understanding in children. Based on case studies by Ness and Farenga (2007) showed how children develop their geometric, spatial and scientific skills in free play with blocks. It was found that when children were engaged in block play, their spatial and geometric concepts as well as architectural principles were updated, and that playing with blocks had a positive effect on children's mathematical behaviour in general.

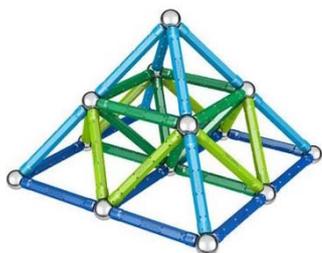


Figure 2: The Geomag mode

Probably less well known is the application of Pop-up projects in mathematics. Their goal is to use the paper and scissors to develop the spatial imagination from planar formations to spatial formations. These formations are also often referred to as "living books". These books were published in the 18th century and were used to entertain children. The first real Pop-up book "Red Riding Hood" was published in 1855 in London. German publishers also gradually joined, especially during the period of rapidly developing colour printing and book production. Finally, in 1925, the first theories emerged that transformed sheets of paper into three-dimensional objects.

Pop-up books are no longer published just for fun but pursue serious educational goals. Paper-cutting and folding techniques allow mechanisms to fold books into three-dimensional shapes (Figure 3). Geometrically, movement, rotation, but also deformation of parallel planes is possible. The resulting shapes differ from the original not only in their third dimension, but also in that they are created in a dynamic way. Imagination is essential for the successful creation of auto-opening products that involve linking the design phase and the implementation

phase with the correct prediction of the outcome. Stages of creating a pop-up model:

1. The project is made on a cardboard sheet.
2. Cut lines and bending lines must be marked separately.
3. The sheets are cut and bent.

The observation of manufactured products makes it possible to discover the transition from planar geometry to spatial geometry, and in the meantime the inverse mechanisms of this transition appear to us. For example, in a cube, we can observe that the sections are parallel to each other, as well as the bends; and the cuts and bends are perpendicular to each other.

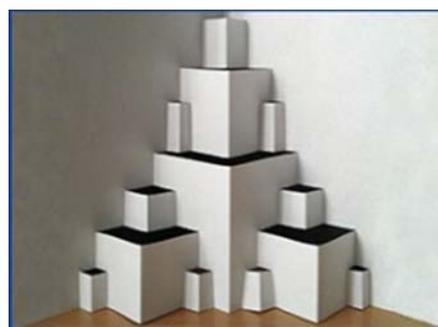


Figure 3: Pop-up model

The Zometoll model set is a unique tool for learning, creating and playing together, and is even able to accomplish this complexity in a simple way. The game with elements of different colours and shapes surprisingly provides an opportunity to get to know the properties of two-, three- or even multidimensional spaces. It develops imagination about plane and space, and planning skills (Figure 4). This creative geometric set allows you to create a wide range of spatial models.

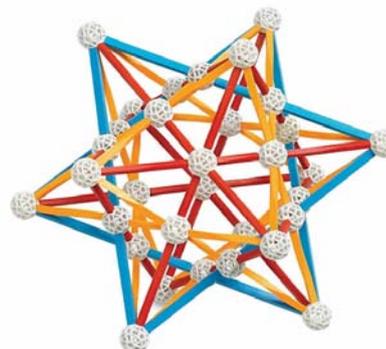


Figure 4: The Zometoll model

The 4DFrame is a new generation of educational tools invented and developed by Ho Gul Park in South Korea. Although his concept and function are simple, the potential for their use is unlimited. Coloured pipe pieces of different lengths are attached and connected together with connections of different shapes, which allow the creation of different types of formations and shapes (Figure 5). It is a useful tool for recognizing basic geometric formations and shapes. Children can even assemble various models with moving parts, such as cars, airplanes, windmills and water wheels. The set provides options for individual and group activities. Groups can learn to work together or discover their own ideas.

The KomTek, based in Järfälle, is a Swedish science and technology centre focused on activities, which regularly uses the 4D Frame tools and collaborates with local schools to develop their applications. Their research has shown that an educational program using the 4D framework improves spatial feeling and mathematical creativity in primary school students (Lee, 2013).

The Jomili set was invented by László Lukovics, who was inspired by the works and creative methods of the painter Victor Vasarely. From the elements of a set of eight differently painted cubes and blocks, it is possible to create a myriad of images and spatial creations (Figure 6). The game develops motor and cognitive skills, dexterity, spatial imagination, creativity and logical thinking. It is not yet widespread in the educational process abroad nor in Slovakia.

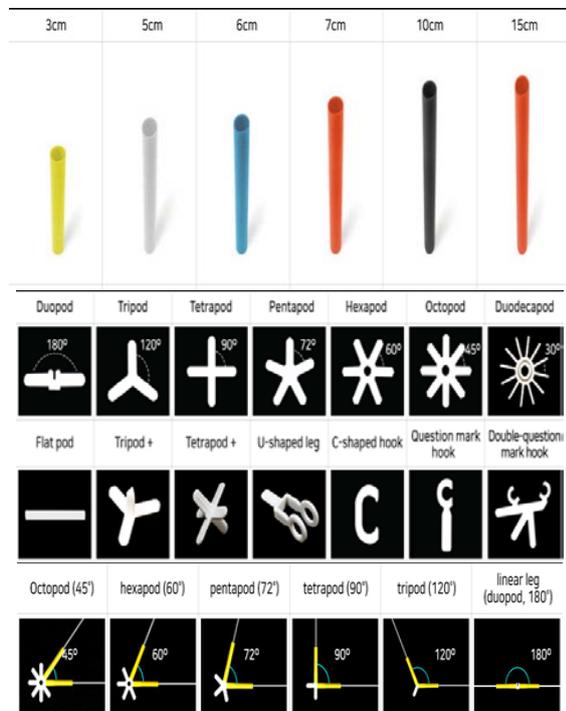


Figure 5: The 4D Frame part of the game

Historically, the combination of origami and mathematics began with the book “Geometric Procedures in Folding Paper” written by the Indian mathematician Tandalam Sundara Row (Row, 1917). In the book, he presented a new and very simple way of realizing geometric constructions. Instead of drawing classic lines and circles, he used paper puzzles (Figure 7). Some math teachers have used origami for long to make their lectures or practices more attractive, and lively.



Figure 6: The Jumili building

There is a lot of literature on this topic, from classical geometric techniques in folding paper to Hull’s recent book (2006) entitled “Origami, Activities for Exploring Mathematics”, which deals with folding paper as a playful form of learning mathematics.

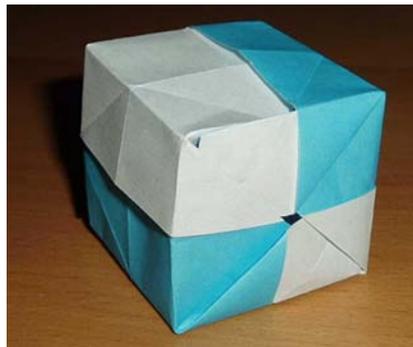


Figure 7: Geometric shapes with paper folding

We can also model geometric bodies with mallets and straws, which we all know, although we do not use these tools in mathematics lessons often enough to improve the geometric imagination. Based on our own experience, we can say that they are excellent for modelling of planar geometric shapes and for the construction of regular bodies, blocks and pyramids within spatial geometry (Figure 8). The elements can be easily inserted into each other and can be used repeatedly.

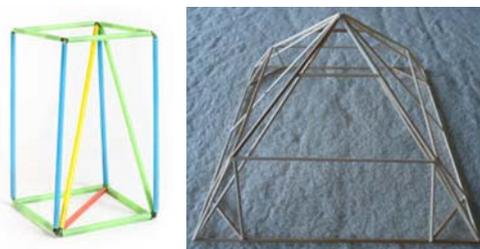


Figure 8: Spatial geometric shapes using straws and mallets

3 Board Games

Previous studies have shown many times that game-based education can also be effective in developing spatial skills. Positive effects of the Lego, the Rubik’s Cube, the Pentomino, and the Tangram for the development of these skills are known. However, the effects of board games on spatial imagination have rarely been studied, so there is little research to help choose the right development board game. In various non-scientific collections, board games were collected that best develop the spatial imagination. We also present board games that could be interesting for senior students in primary schools. They were found in the lists of board games that best develop spatial imagination and for which positive results have emerged in the development of spatial imagination in scientific experiments.



Figure 9: Components of the Ubongo board game

In the Ubongo game, players must use 12 cards to create and cover an empty space on the task board. The game improves the spatial and logical abilities of the players, as they must manipulate, rotate and compare different shapes, then choose the right ones and interpret the diagram according to the assignment (Figure 9). The best use of the Ubongo game is to develop the

ability to know and identify. Because the player must think about rotating and turning cards, this greatly improves the ability to identify spatial shapes (Chung et al., 2017).

The Q-bitz is a visual spatial logic set consisting of four wooden logic sets, each containing 16 pieces of sampled cubes. The cubes of the set have the same design, differing only in colour. The set contains 80 logical puzzle-cards of various difficulty. The Q-bitz puzzles are excellent for developing the visual abilities of distinguishing sampling and spatial thinking abilities. During the game, the pattern shown on the puzzle cards must be stacked using 16 dice so that the sides of the dice are placed on the correct side, as each of their sides covers a different pattern. The puzzles are excellent for teaching concepts of symmetry.



Figure 10: The Q-bitz board game and sampled dice

The Rumis game was inspired by the image of the ruins of the Inca temples including pyramids, tall towers, staircases and various walls. Players must place coloured shapes similar to the colour-painted Tetris wood element so that our own building blocks touch each other during the game (Figure 11). This game thoroughly improves the spatial imagination, as we are still working to place as many of our own elements as possible, while preventing the opponent from placing his elements, which means thinking about possible moves of the opponent, which also leads to tactical considerations. At the end of the game, the one who occupies a larger area wins, as seen at the end of the game from above (Chung et al., 2017). The Rumis game won the award Mensa Select Winner in 2004.

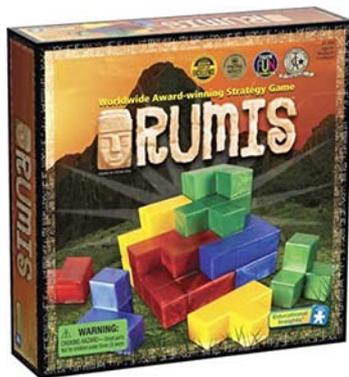


Figure 11: The Rumis game

The Blokus is partly similar to the well-known game Go. Players take turns placing Tetris-shaped pieces on the board, starting from the corner. Each new piece must touch the corner of a previously placed piece of the same colour. The purpose of the game is to occupy as much space on the board as possible, and thus prevent the expansion of your opponents. The game ends when we can no longer place more pieces and all players have been blocked. This game won the Mensa Select Award in 2003. In terms of the development of spatial imagination, the set contains 4 x 21 different Tetris-like shapes of the same colour. These shapes need to be identified, compared and analysed

during the game in order to create a suitable game strategy (Chung et al., 2017). There is also a 3-dimensional version of the Blokus, the Blokus 3D, which is almost identical to the Rumis game described above.



Figure 12: The Blokus and the Blokus 3D social set

4 Conclusion

We have found several remarkable research findings on the use of each of the tools described, but we have not found such a set of manipulation tools that improve spatial imagination. We wanted to partially eliminate this shortcoming and we tried to collect various tools that can be helpful to our colleagues and mathematics teachers. Through this study, it was found that there are number of tools that effectively develop spatial imagination that have been proven by research. The development of spatial imagination using these tools could therefore work more efficiently and thoroughly. Greater presence of creative and constructive activities in the educational process can also contribute to the realization of many other educational goals. The application of these best practices in the teaching of mathematics in Slovakia is nevertheless lacking, so we can talk about a shortcoming that needs to be remedied. Educators use these tools less often, mainly due to lack of time and lack of tools. Research has clearly shown that constructive games have a positive effect on the development of spatial imagination, and also on the development of mathematical and scientific performance (Richardson et al., 2011).

Literature:

1. Cheng, Y. – L., Mix, K., S: *Spatial Training Improves Children's Mathematics Ability*. Journal of Cognition and Development, 2014. 15(1), 2–11p. ISSN 1524-8372.
2. Chung, C.-C., Yen-Chih, H., Yeh, R.-C., Lou, S.-J.: *The influence of Board Games on mathematical spatial ability of grade 9 students in junior high school*. PEOPLE: International Journal of Social Sciences, 2017. 3(1), 120–143p. ISSN 2454-5899.
3. Czeglédy, I., Hajdu, S.: *A nevelés tervezése a matematikaoktatásban*. A matematika tanítása. folyóirat, Budapest, 1982, 24(6). ISSN 1216-6650.
4. Fiala, J.: *Některá využití stavebnic modelů těles k motivaci žáků v matematice*. In Motivace nadaných žáků a studentů v matematice a přírodních vědách. Sborník abstraktů příspěvků z conference, 2013. ISBN 978-80-210-6255-9.
5. Gabajová, M.: *Rozyjanie priestorovej predstavivosti vo vyučovaní matematiky*. 2012. Available at: https://fmph.uni.ba.sk/fileadmin/fmfi/studium/autoreferaty/AR_Gabajova.pdf.
6. Hejný, M. et al.: *Teória vyučovania matematiky 2*. SPN, Bratislava. 1989. ISBN 8008013443.
7. Hull, T.: *Project Origami: Activities for Exploring Mathematics*. Taylor & Francis Inc., Natick, United States. 2006. ISBN 978-1466567917.
8. Jirotková, D., Littler, G. H.: *Komunikace v geometrii*. In: Jirotková Darina a Stehlíková Naďa: Dva dni s didaktikou matematiky 2003, Univerzita Karlova v Praze, Praha. 72-76 p. 2003. ISBN 8072901435.
9. Kárová, V.: *Didaktické hry ve vyučování matematice v 1.-5. ročníku základní a obecné školy: část geometrická*. Západočeská univerzita, Plzeň. 2004. ISBN 8070433035.
10. Lee, J. Y.: *The Effects of 4D-Frame Teaching upon Mathematically Gifted Elementary Students' Mathematical*

Creativity and Spatial Sense. Education of Primary School Mathematics, 2013. 16(1), 1-20p. ISSN 2287-9927.

11. McFarlane, A., Sparrowhawk, A., Heald, Y.: *Report on the educational use of games: An exploration by TEEM of the contribution which games can make to the education process*. Cambridge, England:TEEM. 2002. Available et: http://questgarden.com/84/74/3/091102061307/files/teem_games_ined_full.pdf

12. Molnár, J.: *Rozvíjení prostorové představivosti (nejen) ve stereometrii*. Olomouc: Univerzita Palackého v Olomouci, 2004. ISBN 8024409245.

13. Mudaly, V., Sibiya, M.: *The effects of the geoboard on learner understanding of geometry theorems*, PONTE International Scientific Researchs Journal, 2018. 74(11). Available et: <https://doi.org/10.21506/j.ponte.2018.11.8>.

14. Nagy, J.: *A kognitív képességek rendszere és fejlődése*. Iskolakultúra, 1998. 8(10), 3–21. ISSN 1588-0818.

15. Ness, D., Farenga, S. J.: *Knowledge under construction: The importance of play in developing children's spatial and geometric thinking*. Rowman & Littlefield, 2007. 282 p. ISBN 9780742547896.

16. Newcombe, N. S.: *Seeing relationships: Using spatial thinking to teach science, mathematics, and social studies*. American Educator, 2013, 37(1), 26–31 p. ISSN 0148-432X.

17. Oikun, S., Altun, A., Smith, G.: *Computers and 2D geometric learning of Turkish fourth and fifth graders*. British Journal of Educational Technology, 2005. 36(2), 317–326 p. ISSN 1467-8535.

18. Perný, J.: *Tvorivosti k rozvoji prostorove predstavivosti*. Liberec: Technická univerzita v Liberci, 2004. 77 p. ISBN 8070838027.

19. Richardson, M., Jones, G., Croker, S., Brown, S.: Identifying the task characteristics that predict children's construction task performance. *Applied Cognitive Psychology*, 2011. 25(3), 377–385 p. ISSN 0888-4080.

20. Row Sundara, T.: *Geometrical Exercises in Paper Folding*. Chicago: The Open Court Publishing Company, 1917. Available et: http://stadt-annaburg.de/cms/uploads/media/tsundararowsge_o00rowrich.pdf

21. Scarlatos, L., Landy, S., Breban, J., Horowitz, R., Sandberg, C.: *On the effectiveness of tangible interfaces in collaborative learning environments*. In: Proceedings of SIGGRAPH Conference 2002. TX, San Antonio. 125-126 p.

22. Szabolcs, É., Réthy, E.: *Fröbel és a nőmozgalmak Magyarországon*. Magyar Pedagógia, 1999. 99(4), 363-373 p. ISSN 0025-0260.

23. Uttal, D. H., Cohen, C. A.: *Spatial Thinking and STEM Education*. Psychology of Learning and Motivation - Advances in Research and Theory, 2012. 57, 147–181p. ISSN 0079-7421.

Primary Paper Section: A

Secondary Paper Section: AM, B

FACILITATING VISUAL LITERACY IN FOREIGN LANGUAGE LEARNING

†IVICA KOLEČANI LENČOVÁ

Faculty of Education, Comenius University in Bratislava,
Bratislava, Slovakia
email: "kolecani@fedu.uniba.sk"

Grant: KEGA 004TU Z-4/2019 (Cultural and Educational Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic). Name of the Grant: Tertiary Language Methodology in the Context of Plurilingualism Using New Technologies and Strategies of Facilitating Potential in the Process of Second Foreign Language Learning after English.

Abstract: This article explores the incorporation of visual literacy into foreign language learning and teaching. Considering current trends and the influence of multimedia on society, it is more than evident that the development of visual literacy is crucial for our learners (future 21st century citizens), taking into consideration the escalation of tension between the systematic flow of visual information and the insufficient institutional mediation and support of visual competence. We suggest that the facilitation and development of visual competence in formative subjects and foreign language teaching enables pedagogues to use different visualizations and explore their potential to become an active and creative tool in teaching.

Keywords: Visual literacy, visual culture, visualization, foreign language, new approaches

1 Introduction

Our society has been confronted with unusually dynamic processes of development and continual changes. We live in an epoch of diversity accompanied by a fast-changing environment, both culturally and socially. Attributes such as *multicultural*, *multimodal*, and *multimedia* have all come to the fore alongside progress in technology and globalization issues. The surplus of visual stimuli, their frequency and intensity have resulted in the fact that it has become more difficult to filter them, i.e. to recognize the important and the essential.

The reality is that we are insufficiently equipped with critical thinking skills. Therefore, it is more demanding for us to establish priorities when being confronted with various images, on a daily basis. They are so numerous and versatile that our eyes often see only the surface. So, the way that the image is processed and understood by us as viewers seems to be deficient. Visuals are part and parcel of our life. They activate our senses and intellect, and force us to step outside our comfort zones through combating the indifference. They have the potential to make us feel happy, pleased, content, as well as sad and melancholic. When they irritate us, they can cause feelings of hostility and anger.

We meet visuals almost everywhere. "Not only do they connect with reality, but they have become reality, a part of it. They relate to each other more than other things. Besides this, new challenges and threats have appeared, too" (Šupšáková, 2010, p. 2). Visuals speak to us emotionally and holistically, influencing our social, economic, and political life. New media have created visual impulses that are intensive, diverse, interchangeable, and intertwined with other visual impulses (compare Eupták – Lenčová, 2012). Our everyday activities are interspersed with watching theatre or sport events as part of live broadcast, we travel to different countries, visit places, galleries, nice cafés, go sightseeing, wander the cozy narrow streets, and encounter the local cuisine.

Visual incentives play a crucial role in the area of neuromarketing. They are key determinants of consumers' responsive behaviour and decision-making. Based on this, visuals of different kinds have found their place in the market and we can find them present and attached to many consumer goods of everyday use. This is the way that cultural artefacts such as works of art (or artists themselves), architectonic pieces or regional peculiarities have become incorporated into the commercial sphere. Arising from that, we as consumers drink coffee from a cup which holds the reproduction of Hundertwasser's picture and admire the same artistic reproduction on the scarf, t-shirt, or dress, without having to

abandon our homes in order to visit a gallery or browse through an encyclopedia in the library.

"Visual incentives are part of our everyday life. They are diverse and intense. We can trace them in newspapers, magazines, advertisements, leaflets, on posters or billboards. They can be detected while travelling, located in different means of transport. We can spot them in shops and in the streets. They enter our homes through electronic media...and they are part of our visual memory in the form of images and visual fantasy (Kolečani Lenčová, 2012, p. 5). Visuals are all around us. They are part of us. They influence our perception and understanding of the world. On the one hand, they make our life aesthetically nicer, more colourful and richer, but on the other hand, they can cause monotony, boredom, and colourlessness. Moreover, they indirectly transmit visuals of the culture of the target country, a desired intercultural component in a foreign language classroom (Javorčíková – Zelenková, 2019, p. 30).

2 Visual culture

Visual impulses influence our subconscious cultural knowledge. It is predominantly new media which have a substantial effect on receivers and users. Proliferation of visuals has been ongoing through such devices as mobile phones, digital cameras, or tablets which produce an immense number of media-created images. As a result of this, we feel overwhelmed and overloaded on a social and technical level.

We are mostly unaware of the fact that visual impulses address our senses, as well as guide, manipulate, and change us. It is also difficult for us to recognize authentic from inauthentic, real from unreal, truth from lie. We are mostly influenced by the effects of photography which is often made into an adapted or manipulated version of reality. Despite this, photography is still assumed to be a more reliable source for revealing reality in comparison to other works of art, drawings, or comic books. Although photographs can be inauthentic, fake, or manipulative, they are usually conceived as original, authentic, reliable, genuine, true, objective, etc. This is simply to give an example of how easy it is to exert influence, to manipulate, and to guide us through the medium of visual impulses.

The invention of the printing press in the 15th century represents a cornerstone in communication technologies development. It anticipated a new era, when the book became the most important medium. The second half of the 19th century saw rapid changes in terms of printed text, the power of which decreased over time, as a result of new inventions such as—photography, film, television, personal computers, the Internet, and the arrival of new virtual reality, considered as the latest "discovery". The aforementioned new media are based on images, or to be more exact, on the moving image (excluding photography). This category also contains texts created by new technologies too.

Traditional culture in our countries has been replaced by visual culture which goes hand in hand with cultural change represented by visualization and shift of information from their original non-visual to visual forms (graphs, diagrams, schemes, pictures, films, etc.). (Barkowski – Krumm, 2010). In other words, visualization makes visible all those sources/materials/items which were primarily not visible, in order to save, create, preserve, and enjoy them as part of the documentation cultural heritage.

Visualization can be interpreted as an ability, a process, and a product of creation. It is also a skill needed in order to interpret, use, and reflect on visual forms presented on paper, in our minds or through technological tools. It is all aimed at mediating and communicating information, incentives for thinking, processing, and developing previously unknown thoughts, and fostering understanding. There is a visualization of communication in all spheres of social life, where, excepting stimuli from the real

environment, television and the Internet dominate. Multimedia have become the most common tool for communicating information. Our “modern” life is interlinked with what happens on the screen. We are immersed in images and forget about the text, also excluding our deeper thoughts. Computers and the Internet have become the main tools of visualization. (compare Mikulášová – Mikuláš, 2009; Mikulášová – Mikuláš, 2011a, Mikulášová – Mikuláš, 2011b, 107ff.; Mikulášová, 2013). Visuality is connected with visual culture, and it is also interlinked with visualization as well as with visual products which are outputs of this process (e.g. pictures, graphic representations). Visual communication is a way of transmitting information through the medium of visual code (compare Barkowski – Krumm, 2010, p. 353). Based on this evidence, we assume that visuality can be applied to every item which is created in a visual way, interpreted and produced by people respecting functional, aesthetic and communicative purpose.

3 Visual Literacy

Mediation of information through multimedia happens also through visual material. It is not popular nowadays to read a text which is not accompanied by any visual material or video, whether it is for fun or a part of intensive reading (compare Lupták – Lenčová, 2012). Shorter texts with simple syntactic structures and reduced vocabulary are preferred. It is not only about the production, number, and diversity of formats, but also about the speed of images directed at recipients. From the physiological point of view, eyes are not able to process them.

As was stated before, optic signals and virtual reality are phenomena of today. We receive so much content and information that we are unable to apply our critical thinking skills. All the while, the amount and rate of incoming information accelerates. As a result of this, there is tension between the unceasing flow of visual information and the insufficient institutionalized mediation and support of visual literacy in schools, libraries, museums, and galleries. Therefore, the development of visual literacy has become one of the most important issues in the 21st century. “Implementation of visual media in foreign language teaching can be challenging for a teacher due to its often controversial uses in consumer society. It is also challenging to change an approach to teaching visual literacy in such a way that it becomes an active and creative tool in lessons. However, if accomplished, it could become more interesting and attractive for students too.” (Kolečáni Lenčová 2012, p. 6). This can be especially problematic for those teachers who are not able to assess the richness of visual forms. Therefore, the potential of visual forms remains either fully or partially unexploited due to the insufficient competence of a pedagogue to work with media effectively and systematically. The question is if schools as institutions have got capacity to react flexibly towards the new trends in society (compare Molnářová, 2019, p. 176-177).

Originally, the term *literacy* was related to reading, writing and counting. It was also used to describe the ability of man to understand and to find one’s way in a text. Initially, it also referred to the ability to sign and count. These basic characteristics of literacy cannot be applied anymore in the 21st century because an individual today is an educated person who can function in society responsibly. The term *literacy* has acquired a completely different set of meanings referring to the development of different subskills in aesthetics and the use of language, media, Internet, and ICT.

The relationship between internal and external representations was expressed by Seels (1993) who further differentiates between *Visual Thinking*, *Visual Communication* and *Visual Learning*, taking into consideration intrapersonal and interpersonal characteristics as well as visual learning as a product of the interaction between *Visual Thinking* and *Visual Communication*. When defining and characterizing the term *visual literacy*, it is important to bear in mind the fact that humans have turned to and supported the visual (iconic turn) in the last decades.

Current digital technologies enable us to use multimedia text conglomerates, whereas individual text or visual representations are swept aside. More and more, the preferred approach involves multimodality, which involves the combining and intertwining of different systems (of patterns). It is difficult to define visual literacy due to the aforementioned changes in the concept of literacy and the arrival of digital technologies, but also due to the fact that the adjective “visual” is characterized by ambiguity and uncertainty when referring to something visual, pictorial, optical, which (all) relate to visual perception. Visual versus written or visual versus verbal represent[s] polarization between picture and writing. In German the term *visual literacy* is connected with the term *Bild* and in English there are two terms used, namely: *a picture* and *an image*. *Picture* is bound to a material object, while *image* occurs with non-material aspects, pictures in our mental lexicon or on screen nowadays. Material and figurative representations are inseparable from mental images. External objects trigger internal images.

But this cannot be applied in reverse order – mental image is often not connected with any material picture (Kolečáni Lenčová, 2017, pp. 20-21). A relatively diffused definition of *Visual literacy* can be derived from the fact that it is a broad interdisciplinary concept related to media of every kind. According to Heinrich visual literacy is a learnt skill to interpret and create visual information.¹

This is Peterson’s, relatively concise characteristics of visual literacy (1993, p. 222).

1. *Visual literacy* is viewed as a sum of visual competencies which we acquire when processing a visual stimulus together with our previous sensory experience;
2. *Visual literacy* is understood as a learnt skill which enables us to interpret communication accompanied by visual symbols, and thus create information (messages);
3. *Visual literacy* is a skill which enables us to express images in a verbal form and vice versa;
4. *Visual literacy* is a skill which enables us to process and evaluate information in visual media.

The given characteristic captures the dimension of how the visual impulse is processed, based on the recipient’s mental lexicon. This skill can help the recipient to interpret visual incentives and create them independently. Such an individual is able to adequately process and evaluate the impulses in media. The aforementioned definition of *visual literacy* is not the only definition (of this term) and as such has its shortcomings. On the one hand, it describes exactly which partial abilities are required of a person who is to be designated as a visually competent individual. On the other hand, there is a clear need in the educational sector to combine partial abilities with the methods and structure of the lesson, in correlation with the planned/set main objectives and sub-objectives in the lesson. Šupšáková (2015, p. 16) considers visual thinking, visual perception, visual communication, and development of visual competences as important in the process of learning regarding them as fundamental concepts of visual competence. Based on what was mentioned earlier, we characterize *visual literacy* in the following way: *Visual literacy* is a learnt ability to identify visual products or visual information in different media, to understand, to analyse, to interpret and occasionally to also evaluate them and to be able to communicate about them.

When referring to an educational process i.e. teaching, this would mean that individual visual media (pictures, photography, films, etc.) with their specific qualities and forms of manifestation, conditioned by their characteristics, should be differentiated, and used adequately. In order to implement this teaching, a premeditated and systematic use is required, considering all specifics.

¹ In: Heinrich, R. et al.: Instructional media and the new Technologies of instruction „... die erlernte Fertigkeit, visuelle Botschaften zutreffend zu interpretieren und solche Botschaften selbst herzustellen.“ (1982, p. 62)

In this way, visual media can become proactive in education, while reaching the stated goals. These could also find their place in lessons through particular approaches, serving to facilitate and dynamize the education process. If we use the potential of visual media, we enable students to work effectively with the medium in the adequate context (compare Lupták – Lenčová, 2012, p. 5). If we manage to address the students holistically, their critical thinking skills are supported and creativity is increased. We agree with Schoppe (2013) who states the importance of not overaccelerating the teaching and learning process, because less is sometimes more.²

4 Visual medium in foreign language teaching

Scientific works produced in the area of foreign language teaching deal with visual and audiovisual media, mostly in the context of their instrumental function. In this way, they are viewed as didactic tools for development of language skills and intercultural competence. Less attention is devoted, however, to the function of visual media as a means for the facilitation and development of creativity, individuality, and the holistic nurturing of learners. This potential of media is neither explored nor used to its full extent, which might be caused by the fact that visual media are often viewed as obvious, ordinary, and therefore (mistakenly) considered irrelevant for further analysis of their rich content.

We observe that pedagogues are not sufficiently equipped with the competence needed to work with visual media effectively and systematically (compare Hallet, 2015, p. 27; Kolečáni Lenčová 2017, p. 111; Roche, 2008, p. 247). The fact that more emphasis is put on knowledge and reproduction in schools nowadays, results in the learners' inability to be active, independent, responsible and creative.

Regarding the multidisciplinary character of visual literacy, a solution could be found by combining common principles of closer interdisciplinary cooperation with cognitive psychology, neuroscience, aesthetics, and foreign languages teaching, taking into consideration systematic interconnection with new media (Molnárová, 2016). Implementation of visual and multimedia impulses and a newly-created methodology related to creative-cognitive paradigm could contribute to the development of *visual literacy* among learners. In this reasoning, we follow the premise of I. Schwerdtfeger (1989) who designated visual competence as the fifth communication competence. The premise is based on the fact that visual impulses contribute not only to a correct understanding of communication, but also have a greater ability to facilitate (communication), i.e. they stimulate the desire (more than do verbal stimuli) to communicate more genuinely/authentically with greater involvement. Using pictures in foreign language teaching can become more effective when we cross the borders of traditionally-led classroom (teacher centred) and devote more time and space to the emotionality of learners (learner centred approach). Humanistic concepts, cultural orientation, and aesthetic approaches have brought new possibilities into the traditional structure of lessons, combining cognitive and emotional aspects with learner's experience, and thus making the whole process more effective (Hecke – Surkamp 2015; Gretsch – Holzäpfel, 2016; Kolečáni Lenčová, 2015, 2016, 2017; Zimmer, 2012).

It is here that innovative and non-traditional approaches to the implementation of visual materials can be used, especially in the area of productive language skills development, such as speaking and writing. As far as the topics of lessons are concerned, if what we teach is interconnected with the knowledge and experience of learners, then our pupils' motivation and interest increases. Learners are more motivated if teachers let them choose and prepare their own visual material for classes, simultaneously supporting their autonomy.

Learners are more active and motivated when they see that their opinions matter, when they feel trusted and part of the team. This is what triggers their efforts to be original and creative (Kolečáni Lenčová, 2012; Kováčová, 2015). When processing visual stimuli in foreign language, the personal commitment of the learner facilitates the learning process, and his/her self-confidence is also supported.

The way that visual stimuli influence us anticipates the development of visual literacy of both agents in the teaching process (a teacher and a learner). The teacher who is not equipped with a developed visual competence would only with difficulty be able to work adequately in lessons, moving away from the desired effect. Future teachers of foreign languages are not systematically educated to work with visual materials as it is (mistakenly) considered to be an obvious competence which does not need to be developed further. Moreover, work with visual material is not yet incorporated into educational programmes (curricula) as an independent discipline.

Only a systematic and competent approach of a teacher, taking into consideration the student-centred approach, can lead to the development of visual literacy. In this way, learners are taught to perceive, process, and interpret visual media, or to become their co-creators (e.g. in the creation of computer animations) on a qualitatively higher level. There is a question arising out of this logic. A number of questions arise as a way of thinking: Do we need to teach how to "read" a picture? Is solely looking at the picture not enough? Is this ability inherent? Does it appear naturally in the course of time? It can be generally assumed that decoding a picture is less conventionalized than working with a text.

The learner is an observer in this case, an observe who feels freer, but maybe also uneasy in certain respects. We can take as an example a photograph representing reality. At first sight, it might seem that the content is quite easy to understand, but it does not have to be the case. It can also be easy to decode it, but it might not be in all cases. Digital technology facilitates multimodal communication. *"If we approach foreign languages teaching from the point of view of modality, then implementation and application of information technologies and electronic media into the teaching process and study is a natural step towards diversification of methodology. In this way it becomes a part of teaching tools."* (Hrivíková, 2015, p. 42)

As for *visual literacy*, this means the countless production of new meanings based on the fact that images can be very easily and quickly created, processed, published, combined with the text, used with different colours, media (e.g. paper, screen), formats, levels of abstraction. It mobilizes our subliminal perception and influences our ideas even though they address only our visual sense – we cannot touch, hear, smell or taste what is being displayed.

When it comes to competences in foreign language such as speaking, reading, listening, and writing, *visuality* should be taken into consideration as an interconnection between biologically conditioned sensory perception and culturally conditioned vision. Perception of any visual stimulus does not only happen through communication at the iconic level (picture) but, significantly, on the non-material, symbolic level (image) – as a reflection of what we see.

This implies the fact that a teacher's work with a picture (or an image) cannot depend only on the "established" traditional techniques. We have selected a few representative photographs to exemplify some possible ways of working with visual material (figures 1 – 4). These photographs could be used to begin a discussion. Usually, a teacher starts with instructing learners to describe the photos, the next step is mostly about decoding the relationship between the persons, and that is all. But there are other alternative approaches which could be applied constructively with divergent types of pupils. Working with this sort of visual material can make us abandon traditionally used ways and initiate deeper discussion about the photographs using the following questions: What is your

² Schoppe (2013, p. 1): „Bedingt durch die Menge und das Tempo der Einwirkung gelingt es uns selten, die Mechanismen wahrzunehmen, über die Bilder ihre Wirkung entfalten. Ein wichtiger unterrichtlicher Auftrag ist deshalb die Entschleunigung und damit die Intensivierung der Bildwahrnehmung“.

impression of the photograph? How do you feel after you have looked at it? Is there something that caught your eye? If yes, why? Is there any person you would (not) like to identify with? Give arguments to support your opinion. In this way, pupils create personal relationship with the photograph, they search for something specific in the photograph that can be linked to their emotions, experience or memories, something that mobilizes them internally and will motivate to speak/communicate in a foreign language.

The photographs can trigger fruitful discussions about the experience with siblings, friends, or childhood memories (fig. 1), school memories or memories of activities done during foreign language classes (fig. 2), interconnecting life moments with the time spent with relatives (parents or grandparents) in the kitchen (fig. 3). The fourth photograph may initiate inner monologue. In this way, pupils can express their emotions, thoughts and attitudes, all through the method of identification.



Fig. 1

It is very important for the visual medium (in this case a photograph) to spark curiosity. We can do this by asking the following questions: Where are the parents of the children? (fig. 1); Why are the children wearing masks? (fig. 2); Who are the people in fig. 3 and who do they communicating with?; Where is the woman going? (fig. 4), etc. We could also let the pupil's fantasy work (e.g. What happened 5 mins ago and what will happen in the next 5 mins? etc.). Following these steps, the pupils' utterances are based on their perception and experience and they are always original and unique. Pupils are motivated, and room opens for their self-reflection, self-realization and live interaction among them.



Fig. 2



Fig. 3



Fig. 4

Before applying visual stimuli in foreign language lesson, we should have an elaborate plan regarding the exercises and tasks to be given to our learners. It is also highly recommended to be careful with their formulation and to examine in advance if they are in line with the visually presented information offered, and also if they serve our pupils with sufficient interpretation possibilities in terms of their linguistic and mental abilities. Moreover, we should also be aware of differences between the visual and verbal codification and focus on interaction possibilities between them. As for the teaching of foreign languages, it is crucial to identify cultural conventions too, which are part of visual media. (compare Gretsch – Holzäpfel 2016, pp. 247-248).

5 Conclusion

Visual and audiovisual media are part of the lives of young people. The frequent and systematic implementation of these media in lessons can raise learners' motivation since these didactic materials are close to their everyday lives. Young people can work with different formats of new technologies such as blogs, wikis, podcasts, SozialNews, or other forms of interactive and collaborative Internet phenomena. However, they are often not able to decipher information or decode communication in visual media, because of their specific sign systems and conventions in the context of particular cultural domains.

We assume that visual culture should be incorporated in a more complex way in education constructs (curricula, student's books, standards) regarding foreign languages teaching. *Visual literacy* should be an integral part. This assumption can be substantiated by the fact that the contact with multimedia and visuality is crucial in formative subjects as it is generally believed in school environments. *Visual literacy* creates a multidisciplinary and multidimensional space of knowledge. It can also be defined as a cross-curricular topic in foreign-language teaching. The development of visual literacy can be supported by integrating different types of visualizations (artefacts, linguistic landscapes, etc.). Their potential and formative influence on the holistic development of a learner creates stimuli for creative (self) realization, which happens through the medium of aesthetic and affective experience, openness, and freedom of interpretation.

Literature:

1. Barkowski, H. – Krumm, H.-J.: *Fachlexikon Deutsch als Fremd- und Zweitsprache*. Tübingen und Basel: A. Francke Verlag, 2010. 383 p. ISBN 978-3-7720-8322-8.
2. Gretsch, P. – Holzäpfel, L.: *Lernen mit Visualisierungen*. Münster: Waxmann Verlag, 2016. 289 p. ISBN 978-3-8309-3414-1.
3. Hallet, W.: Die Visualisierung des Fremdsprachenlernens. Funktionen von Bildern und visual literacy im Fremdsprachenunterricht. In Lieber, G. (Hg.). *Lehren und Lernen mit Bildern. Ein Handbuch zur Bilddidaktik*. Baltmannsweiler: Schneider Hohengehren, 2013, pp. 213-224. ISBN 978-3-8340-0478-9.
4. Hallet, W.: Viewing Cultures: Kulturelles Sehen und Bildverstehen im Fremdsprachenunterricht. In Hecke, C. – Surkamp, C. *Bilder im Fremdsprachenunterricht*. Tübingen: Narr Verlag, 2015, pp. 26-54. 386 p. ISBN 978-3-8233-6949-3.
5. Heinrich, R. et al.: *Instructional media and the new technologies of Instruction*. New York: John Wiley and Sons, 1982. ISBN 978-0023530609.
6. Hrivíková, T.: Interkultúrna komunikácia a využitie informačných technológií v pedagogickej praxi. In Koželová, A. – Broďňanská, E. *Informačno-komunikačné technológie a vyučovanie jazykov. Pro et contra*. Prešov: Filozofická fakulta Prešovskej univerzity v Prešove, 2015, pp. 40-46. 126 p. ISBN 978-80-555-1391-1.
7. Javorčíková, J. – Zelenková, A.: CLIL: Conceptual differences in teaching "realia" to philological and non-philological students. In *Journal of Language and Cultural Education = JoLaCE*. - De Gruyter Open, 2019, pp. - ISSN 1339-4045. - Vol. 7, no. 3 (2019), pp. 18-34. DOI: 10.2478/jolace-2019-0019.
8. Kolečáni Lenčová, I.: *Vizuálne médium vo výučbe cudzích jazykov. Vybrané kapitoly s praktickými ukážkami z nemeckého jazyka*. Banská Bystrica: FHV UMB, 2012. 138 p. ISBN 978-80-557-0428-9.
9. Kolečáni Lenčová, I.: Bildende Kunst im interkulturellen DaF-Unterricht: Avantgarde und Moderne. In Janíková, V. – Andrášová, H. (Hg.). *Deutsch ohne Grenzen. Didaktik Deutsch als Fremdsprache*. Brno: Tribun, 2015, pp. 180-202. ISBN 978-80-263.09321.
10. Kolečáni Lenčová, I.: Ästhetisches und kulturelles Lernen mit Kunstbildern. In *CROSSING BOUNDARIES IN CULTURE AND COMMUNICATION*. Vol. 7, no. 1 (2016), pp. 124-136. ISSN 2248-2202.
11. Kolečáni Lenčová, I.: Visual literacy v cudzojazyčnej edukácii. In Lupták, M. et al. (eds.) *Aplikované jazyky v univerzitnom kontexte 4*. Zvolen: Technická univerzita, 2017, pp. 16-26. 258 p. [CD-ROM] ISBN 978-80-228-3002-7.
12. Kováčová, M.: *Interkultúrna komunikácia. Aplikácie pre vybrané nemecké a slovenské kontexty*. Košice: UPJŠ, FF, 2015. 206 p. ISBN 978-80-8152-266-6.
13. Lupták, M. – Lenčová, M.: *Sing mit und lern! : Venujeme Matejovi a všetkým deťom*. Zvolen: Technická univerzita vo Zvolene, 2012. ISBN 978-80-228-2330-2.
14. Mikulášová, A. – Mikuláš, R.: Kinder- und Jugendliteratur in der Medienkommunikation. In *Slowakische Zeitschrift für Germanistik*, 1, 2009, pp. 12-18. ISSN 1338-0796.
15. Mikulášová, A. – Mikuláš, R.: Von der literarischen Kommunikation (LK) zur medialen Kommunikation. In: *Studies in Foreign Language Education 3*. Nümbrecht: Kirsch Verlag, pp. 2011a, 82-92. ISBN 978-3-933586-85-8.
16. Mikulášová, A. – Mikuláš, R.: Diskurse der Kinder- und Jugendliteraturforschung. Nümbrecht: Kirsch Verlag, 2011b. 140 p. ISBN 978-3-933586-79-7.
17. Mikulášová, A.: Neue Medien im Kontext der Kinder- und Jugendliteraturforschung. In: *Perspektiven der Auslandsgermanistik*. Berlin: Weidler Buchverlag, 2013, pp. 155-165. ISBN 978-3-89693-596-0.
18. Molnárová, E.: Podcasts - eine neue Lehr- und Lernkultur. In: *Germanistik interdisziplinär: Sprache und Sprachen in Forschung und Anwendung (SIFA)*. Hamburg: Verlag Dr. Kovač, 2016, pp. 365-371. ISBN 978-3-8300-9148-6.
19. Molnárová, E.: Komunikácia obrazu a textu vo vybraných učebniciach nemeckého jazyka. In: *Aplikované jazyky v univerzitnom kontexte 6*. Zvolen: TU, 2019, pp. 175-183. ISBN 978-80-228-3176-5.
20. Petterson, R.: Visual literacy und Infologie. In B. Weidenmann (Ed.), *Wissenserwerb mit Bildern. Instruktionale Bilder in Printmedien, Film/Video und Computerprogrammen*. Bern: Verlag Hans Huber, 1993, pp. 215-235.
21. Roche, J.: Fremdspracherwerb. Fremdsprachendidaktik. Tübingen: A. Francke Verlag, 2008. 286 p. ISBN 978-3-8252-2691-6.
22. Schwerdtfeger, I.: *Sehen und Verstehen. Arbeit mit Filmen im Unterricht Deutsch als Fremdsprache*. Berlin: Langenscheidt, 1989. ISBN 3468494386 9783468494383.
23. Seels, B.: Visual literacy. The definition Problem. In Moore, m., Dwyer, F. (Hg.), *Visual literacy: A Spectrum of Visual Learning*. Englewood Cliffs, NJ: Educational Technology Publications, 1993, pp. 97-112.
24. Schoppe, A.: *Bildzugänge*. Seelze: Klett / Kallmeyer, 2013. 192 p. ISBN 9783780010766.
25. Šupšáková, B.: *Vizuálna gramotnosť*. Brno: Tribun EU. 2015. 134 p. ISBN 9-788026-309345.
26. Šupšáková, B.: *Vizualita, vizuálna kultúra a stratégie rozvíjania obrazotvornosti*. [online] 2010. Link: <http://www.arteducation.sk/publikacie-studie-clanky/detail/vizualita-vizualna-kultura-a-strategie-rozvijania-obrazotvornosti/studia/> [2021-06-09]
27. Zimmer, R.: *Handbuch der Sinneswahrnehmung. Grundlagen einer ganzheitlichen Erziehung*. Freiburg: Herder, 2012. ISBN 978-345132501.

Primary Paper Section: A**Secondary Paper Section: AM**

IMPACT OF WORKING ENVIRONMENT ON STUDENT LEARNING

^aDANKA LUKÁČOVÁ, ^bGABRIEL BÁNESZ, ^cIVANA TUREKOVÁ

*Constantine the Philosopher University, Faculty of Education,
Department of Technology and Information Technologies,
Dražovská cesta 4, 949 74 Nitra, Slovakia
email: ^adrukacova@ukf.sk, ^bgbanesz@ukf.sk, ^citurekova@ukf.sk*

This work has been supported by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic under the project No. VEGA 1/0668/18.

Abstract: Optimal working environment conditions contribute to people's well-being, whether at home or at work. The article deals with the determination of the objective values of selected factors of the working environment of students at the university during the lessons and their subjective evaluation of these factors before and during the lessons. Objective data on five factors of the working environment (temperature, relative humidity, noise, lighting, CO₂ content) were measured by measuring instruments. The results of the measurements were compared with the results of questionnaires 1 and 2. The survey showed that students are able to identify unsatisfactory classroom environments that have a negative impact on learners' learning and attention.

Keywords: working environment, objective values, subjective evaluation, questionnaire.

1 Introduction

The bioecological model of human development suggests that individual learning and the psychological functioning of students are influenced by several factors. Although not typical, the work environment can also be considered a context of human development (Evans, 2003, Hanuláková et al, 2019).

Poor organization of teaching or sub-optimal conditions in the work environment can impair the ability of individuals in the school, work or home environment to adequately process new information in a way that allows it to be retrieved and stored (Maxwell, 2010). The effects of working environment factors have been studied in relation to a wide range of human functions, including cognitive processes (e.g. Hygge, Knez, 2001) and mental health (Evans, 2003). The authors of these works mostly examine the influence of one factor on cognitive and psychological effects on students. Several factors of the working environment (e.g. temperature, lighting and noise) are rarely studied in the same study. Scientists focus only on one factor in the work environment, or on a combination of two environmental factors in an effort to isolate the impact of each component, and also develop and test the theory of processes that underlie the mechanism by which each element affects cognitive and psychological factors. (e.g. Sörqvist, Stenfelt and Rönnberg, 2012). Several of these studies have shown that, in listening-oriented tasks, a non-standard classroom environment may have an adverse effect on the education and performance of students, even in the test population with developed learning abilities (G. C. Marchand et al., 2014).

For this reason, we have decided to carry out a survey that will examine the impact of several factors of the working environment on students in their working environment - in the classroom.

2 Research objectives and methodology of the research

The survey was designed to address the following objectives:

1. To find out the objective state of factors of working environment of students.
2. To find out the students' subjective opinions on the monitored factors of the working environment.
3. To compare objective results of measurements with subjective statements of students.

In order to meet the objectives, an experiment was carried out, in which the students were trained in the information and

communications technology classroom in the subject of Information and communication technologies and the monitored factors of the working environment of the students were measured during the lessons.

Based on previous research (Hygge, Knez, 2001) that individuals are able to detect negative factors of the working environment, we expected students to evaluate each of the monitored factors of the working environment more negatively than the objective values of individual factors.

Participants of the survey were university students of teaching study programs at the University of Constantine the Philosopher in Nitra. A total of 53 respondents participated in the survey. The survey was carried out in a classroom for information and communication technologies. The classroom made it possible to accurately measure and control several environmental factors (room temperature, outdoor temperature, air velocity, CO₂, lighting and noise). Room size was 7.5 meters and 5 meters. Students were taught from 8.00. to 14.30. continuously, with one lunch break at 11.30. 20 students took part in the lessons for the whole time which corresponds to the capacity of the classroom.

The measurement took place in a room located in the building of UKF in Nitra on the street Dražovská 4. The room is located on the second floor. The building is oriented in the north-south direction, with all the windows facing west. The room is designed for teaching subjects using computer technology. For this reason, it is equipped with 20 notebook computers and one Tower PC with a separate display unit. In addition, a projector is located on the ceiling and a box with the ads is located in the corner of the room. On each table there are two computers that students work with.

Objective data on five factors of the working environment (temperature, relative humidity, noise, lighting, CO₂ content) were measured by measuring instruments. Indoor temperature, CO₂ and noise sensors were placed in the middle of the room. The ambient temperature was controlled by a standard mercury thermometer. Illumination was measured at a network of selected checkpoints. The height of the reference plane was 0.85 m above the floor, the spacing between the measuring points was 0.5 to 2 m, and the distance of the edge points of the net was 1 m from the wall. The other checkpoints were spaced at regular distances at a density to provide a sufficient mapping of spatial progression, changes in illumination, and locations with the highest and least illumination intensity (Škvařil J., 2004, STN EN 12464-1: 2012).

The lighting in the classroom was measured with the Testo 545. The EXTECH® Anemometer AN 340 was used to objectify temperature and relative humidity. The concentration of carbon dioxide in the classroom was objectified by the TESTO 315-3 CO/CO₂ instrument. Sound intensity was measured using a Testo 8016-1 sound level meter. The main sources of noise were rivers, a data projector, computers and student and teacher talk. The course was focused on students' independent work with the Microsoft Office.

The survey focused on the perception of students in the test room, the conditions and the extent to which they felt the working environment and how it affected their attention and wellbeing in the classroom.

Before the beginning of experimental teaching, we examined the significance of individual factors of the working environment on a sample of 53 students. They expressed opinions in questionnaire 1 on five factors: air humidity, air temperature, CO₂ content in the air, room lighting, room noise. They could choose the answer on the Likert scale from 1 (very insignificant factor) to 5 (very significant factor). On October 18, 2019, we did experimental lessons in the classroom, where the monitored factors of the working environment were measured.

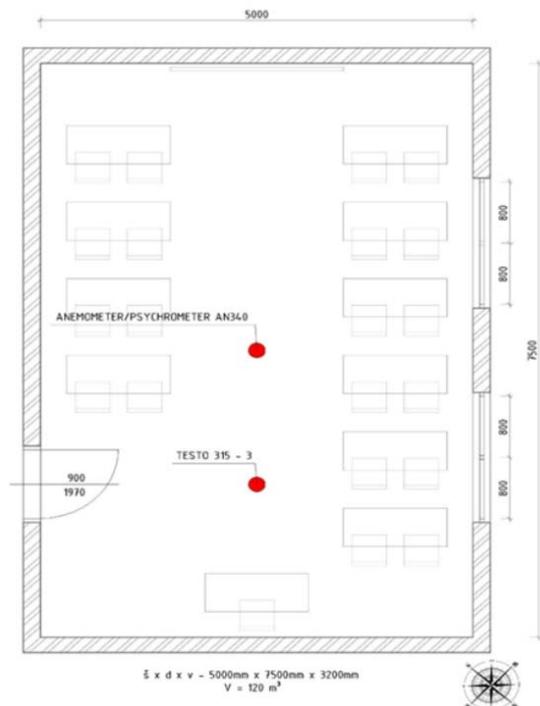


Figure 1: A plan view of the classroom indicating the location of the measuring instruments

After completing the lessons, the students completed the second questionnaire. The questionnaire consisted of 10 items on which the participants put forward their positions through a five-point Likert scale from 1 strongly agree to 5 strongly disagree.

3 Results of objective measurements of working environment factors

According to the Slovak Hydrometeorological Institute, the daily temperature on 18 October 2019 ranged from 8 to 20 °C measured in the meteorological station Nitra - center. Measurement of outdoor temperature in the school area showed values in the interval from 15 to 21 °C, in the time interval from 8:00 to 14:30. The process of temperature and relative humidity changes at the measured workplace is shown on the figure 2.

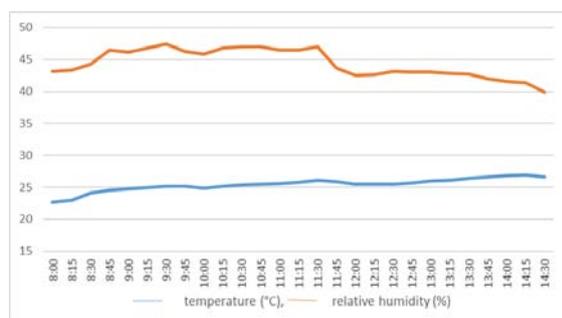


Figure 2 Temperature and relative humidity

As can be seen from the picture above, the temperature at the workplace ranged from 22.6 °C to 26.9 °C. The highest temperature was measured at 14:15. The arithmetic mean of the temperature was 25.4 °C with a mode of 25.5 °C.

The relative humidity in the room varied between 39.9 % and 47.4 %. The highest relative humidity was recorded at 9:30. The arithmetic mean of relative air humidity was 44.4 % with a mode of 46.5 %. The greatest change in humidity occurred in the time interval from 11:30 to 12:00, where the air humidity dropped from 47.0 % to 42.5 %.

The process of the carbon dioxide content, expressed in ppm over time, is shown in the figure 3.

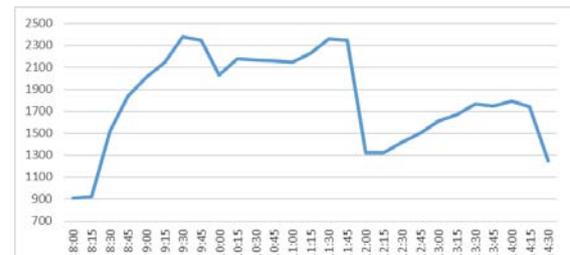


Figure 3 The process of the carbon dioxide content, expressed in ppm

The amount of carbon dioxide in the classroom ranged from 910 ppm to 2380 ppm. The highest oxide concentration was recorded at 9:30. The arithmetic mean of the measured values was 1 809.2 ppm, with a mode of 2150 ppm. The biggest decrease in the amount of carbon dioxide occurred between 11:45 and 12:00, where the amount of carbon dioxide decreased from 2,350 ppm to 1,320 ppm.

This is probably related to a lunch break when the classroom was more intensely ventilated.

The process of maximum, medium and minimum noise is shown in the figure 4.

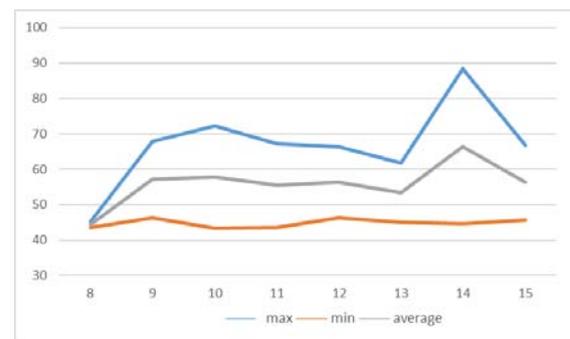


Figure 4 Sound waveform in dB

Using a noise meter, the maximum and minimum noise levels were recorded in the classroom. The noise level ranged from 43.4 dB to 88.3 dB. The highest noise level was at 14:00. At that time, there was a discussion between the students and the teacher on the subject matter that had been taken over and on the assignments they were dealing with during the day.

As the measured values show, the temperature gradually increased from the beginning to the end of the measurement. The relative humidity increased gradually from the beginning of the measurement until it reached extreme values at 9:30, where the highest concentration of carbon dioxide was also present. At 11:30, when there was a break in the classroom, the relative humidity of the air dropped and it did not increase anymore and tended to decrease. When measuring the amount of carbon dioxide, the biggest change occurred during the lunch break, after which the concentration no longer increased significantly. The highest noise level was recorded at 14:00. The average daylight value was 176.81 lx.

4 Results of respondents' subjective statements

53 respondents answered the first questionnaire. Table 1 summarizes the responses of respondents to which factors in the working environment they attribute most importance. For each questionnaire item, we calculated the average value of the respondents' answers.

Table 1: The average value of the respondents' answers

average value	factor
3.17	humidity
3.89	temperature
3.81	CO ₂
4.02	lighting
3.72	noise

The highest average value was achieved by lighting as a factor to which respondents attribute the greatest importance.

A more detailed analysis showed that up to 40 respondents rated this factor with 4 - a significant factor, 5 - a very significant factor (Figure 5).

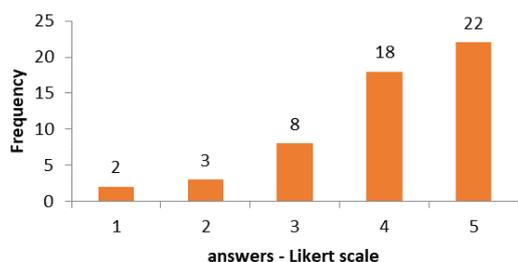


Figure 5: Frequency of respondents' answers in the first questionnaire

The second questionnaire was filled in only by those respondents who attended the lesson at the time of the measurement. The questionnaire commented on how the factors of the working environment influenced their performance in curriculum interpretation and independent work and identified the factors that caused them difficulties in focusing on curriculum interpretation and independent work. The respondents' answers are given in Table 2.

Table 2: Frequencies of respondents' answers to questionnaire items

item	answer				
	1	2	3	4	5
1. The humidity of the room negatively influenced my performance in the interpretation of the curriculum and independent work.	1	8	5	2	4
2. I had difficulty focusing on the interpretation of the curriculum and working independently because of the humidity in the room.	3	4	5	3	5
3. The temperature of the room has negatively affected my performance in the interpretation of the curriculum and independent work.	4	8	2	5	1
4. I had difficulty focusing on the interpretation of the curriculum and working independently because of the room air temperature.	3	7	2	5	3
5. Stale air in the room has negatively affected my performance focused on the interpretation of the curriculum and independent work.	7	4	2	4	3
6. I had difficulty focusing my attention on reading and testing tasks due to poor air in the room.	4	8	3	3	2
7. The illumination of the room negatively influenced my performance in the interpretation of the curriculum and the independent work.	4	5	5	4	2
8. I had difficulty focusing on the interpretation of the curriculum and working independently because of the illumination in the room.	4	6	4	4	2
9. The noise level in the room has	1	7	2	5	5

negatively affected my performance in the interpretation of the curriculum and independent work.					
10. I had difficulty focusing on the interpretation of the curriculum and working independently because of the noise levels in the room.	1	6	4	6	3

Individual items of the questionnaire were characterized by arithmetic mean. 1 point was given to the answers "I strongly agree", to the answers "I agree" 2 points, "I cannot comment" 3 points, "I disagree" 4 points and "I strongly disagree" 5 points. We identified the ambient temperature in the room as the factor that influenced the respondents most during the teaching and individual work of students. Respondents identified as the second most important factor the amount of CO₂ in the air, i.e. the quality of the air they breathed during the class. As we can see, there was no consensus between the preference of the work environment factor from the 1st questionnaire and the determination of the factor that had the greatest impact on the teaching (Table 3).

Table 3: Arithmetic mean of respondents' answers for individual factors influencing attention

average value	factor	objective values
3	humidity	39.9 % - 47.4 %
2.5	temperature	22.6 °C - 26.9 °C
2.55	CO ₂	910 ppm - 2 380 ppm
2.75	lighting	78 lx - 379 lx
3.3	noise	43.4 dB - 883 dB

According to the results of the questionnaire, the most significant factor that caused difficulties for students to focus their attention on the explanation of the curriculum or during their own work is the content of CO₂ in the air (Table 4).

Table 4: Arithmetic mean of respondents' responses for each factor causing difficulty

average value	factor	objective values
3.15	humidity	39.9 % - 47.4 %
3	temperature	22.6 °C - 26.9 °C
2.55	CO ₂	910 ppm - 2 380 ppm
2.7	lighting	78 lx - 379 lx
3.2	noise	43.4 dB - 883 dB

Another important factor identified by students as a factor causing difficulty in focusing on teaching was lighting (average 2.55 points). In this case, there was a partial agreement between the assumed factor of the working environment, which the students identified as significant in the 1st questionnaire and the outcome of their opinions after teaching in a particular environment.

5 Discussion and conclusion

It is also apparent from objective measurements that the illumination in the room was not sufficient, although it must be kept in mind that teaching at the university is supposed to work with a data projector which requires at least a partial dimming of the illumination for better visibility. However, as can be seen in the comparison of respondents' statements in Table 4 and objectively obtained values for factors of the working environment, lighting was one of the factors that seriously impaired the well-being of students and made it difficult to work independently. Similarly, the amount of carbon dioxide that reached up to 2380 ppm in objective measurements was perceived by students as a factor that caused them difficulty concentrating on teaching. Ventilation that took place at lunch time is not considered sufficient and it would be necessary to include intensive ventilation earlier, e.g. around 9:30 am, especially if the classroom is fully occupied. Of course, the most effective way to avoid the negative impact of the work environment on student learning is to install equipment in the classroom to create a controlled work environment. However, it is currently very economically demanding for universities, not

only in Slovakia but also abroad, as several experts have stated (Kaiser, Davis, 1996; U.S. Department of Education, 2000, U.S. General Accounting Office, 1995).

The survey showed that students are able to identify unsatisfactory classroom environments that can have a measurable negative impact on their learning and attention. The results of the survey contribute to a better understanding of how the integrated effects of several factors in the work environment affect learners' learning and activity.

Literature:

1. Evans, G. W.: *The built environment and mental health*. In Journal of Urban Health, vol. 80, No 4, 536-555, 2003.
2. Hanuláková, E., Daňo, F., Drábik, P.: *Approaches to Education in the Field of Management, Marketing and Environmental Consulting*. In Ad Alta, vol. 09, issue 01, p. 84-91.
3. Hygge, S., Knez, I.: *Effects of noise, heat, and indoor lighting on cognitive performance and self reported affect*. In Journal of Environmental Psychology, vol. 21, no 3, p. 291-299, 2001. From: <http://dx.doi.org/10.1006/jevp.2001.0222>.
4. Kaiser, H. H., Davis, J. S.: *A Foundation to Uphold: A study of facilities conditions at US colleges and Universities*. Alexandria VA: APPA: Association of Higher Education Facilities Officers, p. 22314-22818, 1996.
5. Laurie Lewis et al: *U.S. Department of Education, National Center for Education Statistics: Condition of America's Public School Facilities: 1999*. Washington, DC: Bernie Greene, project officer, 2000.
6. Marchand, G. C. et al.: *The impact of the classroom built environment on student perceptions and learning*. In Journal of Environmental Psychology, No 40, 2014, p. 187-197.
7. Maxwell, L.: *Chaos outside the home: The school environment*. In Chaos and its influence on children's development: An ecological perspective Washington DC: American Psychological Association, pp. 83-95, 2010.
8. STN EN 12464-1. *Light and lighting. Lighting of work places. Part 1: Indoor work places*. 1. 3. 2012.
9. Škvařil, J.: *Design and Measurement of Indoor Spaces*. In Electrotechnical magazine. No. 3, pp. 70-73, 2004.
10. Sörqvist, P., Stenfelt, S., Rönnerberg, J.: *Working memory capacity and VisualeVerbal cognitive load Modulate AuditorySensory Gating in the Brainstem: Toward a Unified View of attention*. In Journal of Cognitive Neuroscience, Vol 24, No 11, p. 2147-2154, 2012.
11. Tureková, I., Lukáčová, D., Bánesz, G.: *Quality Assessment of the University Classroom Lighting - A Case Study*. In: TEM Journal, Vol. 7, No 4, 2018, p. 829-836. ISSN 2217-8309.
12. U.S. General Accounting Office: *School facilities: America's schools not designed or equipped for 21st century*. GAO report number HEHS-95-95. Washington, D.C.: General Accounting Office (ED383056), 1995.

Primary Paper Section: A

Secondary Paper Section: AQ

PLURILINGUAL APPROACH IN FOREIGN LANGUAGE TEACHING AND FOREIGN LANGUAGE TEACHER EDUCATION IN SLOVAKIA FROM THE INTERDISCIPLINARY POINT OF VIEW

^aIVICA KOLEČANI LENČOVÁ, ^bMAREK LUPTÁK

^a*Department of German Language and Literature, Faculty of Education, Comenius University in Bratislava, Račianska 59, 813 34 Bratislava, Slovak Republic*

^b*Institute of Foreign Languages, Technical University in Zvolen, T. G. Masaryka 24, 96001 Zvolen, Slovak Republic*
email: ^akolecani@fedu.uniba.sk, ^bmarek.luptak@tuzvo.sk

Grant: KEGA 004TU Z-4/2019 (Cultural and Educational Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic). Name of the Grant: Tertiary Language Methodology in the Context of Plurilingualism Using New Technologies and Strategies of Facilitating Potential in the Process of Second Foreign Language Learning after English.

Abstract: The article responds to the requirement of creating tertiary language didactics (L3), following teaching of English as L2. In the plurilingual context, the research focuses on partial issues of the facilitation impact of English (L2) on the third foreign language (L3). With regards to the language policy in Slovakia, research results point out the possibilities of interdisciplinary cooperation in foreign language education with the focus on analysis and comparison of selected aspects in the training of future German teachers. The research also indicates potential opportunities for innovation in their pre-graduate preparation.

Keywords: Plurilingualism, Foreign Language, Language Policy, Didactics of Tertiary Language

1 Introduction and concept

The pedagogical empiricism and the research in neurolinguistics and psycholinguistics indicate a high degree of similarity in foreign language learning in the institutional school background. The advantage of the potential interdisciplinarity has not been taken into consideration up to now. The cross-linguistic way of thinking is emphasized by the plurilingual point of view in the foreign language teacher education. Therefore – and on the basis of learning and teaching German as a tertiary language L3 after English as the first foreign language L2 in the primary, lower secondary and upper secondary education in Slovakia – the following questions are to be addressed: How can the first foreign language L2 help in tertiary language learning L3? What should be taught in the teacher education of German as a tertiary language (or second foreign language) L3 after English as a foreign language L2? Which aspects have the German as L3 teaching and the English as L2 teaching in common and which aspects are different in theory and practice? This approach is focused on the interdisciplinarity and cooperation in the foreign language teacher education with the following succession of language acquisition – Slovak as a native language L1, English as a first foreign language L2 and German as a second foreign language L3 in the Slovak educational system.

This paper on the plurilingualism does not consider the relevant question as to which foreign language should be taught as the first foreign language in the primary education. The executive representatives are to take into account that the first foreign language L2 within early foreign language acquisition is vitally important for the support of the plurilingual educational concept. The first foreign language L2 and its teaching quality have the potential to motivate, and as Widlok – Petravič – Org – Romcea (2010, p. 8) remark it opens the door for the learning of next foreign languages.

According to the Action Plan 2004-2006 of the European Commission, promoting the linguistic diversity by teaching and learning at least two foreign languages from a very early age is the cornerstone of the European project and belongs to the educational policy objectives of the European Union.¹ The formula 'mother tongue plus two other languages' requires that language learning in primary school is as much effective and motivational as possible. Therefore, the quality of the foreign language teaching at an early age is to be raised, and the

education and appropriate qualification of the first foreign language teachers may not be neglected either (cf. Danihelová, 2018, p. 43). The foreign language teachers with repertoire of two foreign languages and with awareness of the plurilingual approach in the teaching of the tertiary language L3 are needed. The term 'tertiary languages' L3 refers to foreign languages learned after the first foreign language L2 with a little chronological shift (cf. Hufeisen – Neuner, 2005; Hufeisen – Neuner, 2004). The study reflects the current legal framework of the institutional foreign language educational policy. The research is focused on the acquisition of the first language (L1) – Slovak, the learning of the first foreign language (L2) – English, the learning of the second foreign language (L3) – German and the learning of other foreign languages (Lx).

2 Foreign languages in education policy

For Genzor – Krupa (1996, p. 33), the national borders overlap rarely with the ethnic and linguistic borders. For this reason, the foreign languages taught at schools in Europe or in the world play a decisive role. In the past, Great Power policy exerted influence on the choice of foreign languages in the educational policy in many countries. Russian was the compulsory foreign language in Czechoslovakia before the Velvet Revolution of 1989. The Slovak Republic became a member of the European Union on 1st May 2004. Multilingualism is one of the EU's founding principles.² This multilingualism policy is based on communicating with its citizens in their own languages and promoting language learning within the EU. The EU has 24 official languages and protects Europe's rich linguistic diversity. The multilingual society does not imply an immediate application of plurilingual approach. Plurilingualism means the ability of an individual to speak in more than one language and to switch between multiple languages depending on the communication and related situational pragmatic framework. Another argument supporting plurilingualism is represented by the Schengen Agreement on abolishing border checks for people and goods. The border checks between the Slovak Republic and other EU countries were eliminated on 21st December 2007. This is also in accordance with the idea of learning more than one foreign language in Slovakia as well as other EU member states. The language dominance varied several times in the past. As Genzor – Krupa (1996, p. 37) point out, the language relevance in the European language area depending on the number of speakers is as follows:

Tab. 1: Overview of the European language area from the mid-20th century (Genzor – Krupa, 1996, p. 37)

	Language	Number of speakers (million = m)
1.	Russian	120 m
2.	German	95 m
3.	English	60 m
	French	60 m
	Italian	60 m
4.	Ukrainian	40 m
5.	Spanish	35 m
	Polish	35 m

The dominance and changes in order of languages are associated with the colonial expansion of European countries in 15th – 19th century (cf. Genzor – Krupa, 1996, p. 37). Lately, the role and the rank of a language within the worldwide context have been in favor of English, due to the importance of the English language in the international business communication. The following overview of languages in the worldwide context was introduced by the authors Genzor – Krupa (1996):

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52003DC0449>

² Cf. https://europa.eu/european-union/about-eu/eu-languages_en

Tab. 2

Language		Number of speakers (million = m)	There of L2 speakers (million = m)
1.	Chinese	1200 m	120 m
2.	English	610 m	250 m
3.	Hindi	438 m	80 m
4.	Spanish	325 m	32 m
5.	Russian	290 m	120 m
6.	Arabic	244 m	20 m
7.	Bengali	186 m	2.4 m
8.	Portuguese	175 m	5 m
9.	Indonesian	150 m	130 m
10.	Urdu	143 m	85 m

In 2011, the English language was established as the first and only compulsory foreign language in the Slovak Act on Education. However, the Act no 245/2008 Coll. on Education mentions that the learners should be enabled to master the English language and one other foreign language and be able to use them. The Act on Education is further amended by the National Program of Education, where curricula and standards are specified. The curricula and standards further specify the number of classes per week in individual grades of the primary and secondary education. The innovated National Program of Education, valid since 1st September 2015, the second foreign language became a facultative subject with 2 classes available per week. In addition, the innovated National Program of Education aims to encourage the education of sciences in primary and secondary education. Since 2011, the Association of German Language Teachers and Germanists in Slovakia (SUNG) has been engaged in the process of promoting the teaching of another compulsory foreign language along with English. The only change that has taken place since 2019 is represented by a free choice of the first foreign language in primary education.

Tab. 3: Amendment to the curriculum for primary schools with Slovak as the mother tongue

Field of education	Subject	Grade Primary education					Grade Secondary education					
		1	2	3	4	Σ	5	6	7	8	9	Σ
Language and communication	Slovak language and literature	9	8	7	7	31	5	5	4	5	5	24
	First foreign language L2			3	3	6	3	3	3	3	3	15
Total number of classes		20	20	23	25	88	24	25	26	27	25	127
Available classes		2	3	2	1	8	3	4	4	3	5	19
Total number of classes		22	23	25	26	96	27	29	30	30	30	146

The following foreign languages can be taught in the primary education since September 2019, assuming the interest of learners and parents and available qualified staff at schools: English, French, German, Russian, Spanish, and Italian. In the 7th-9th grade, primary schools shall offer also a facultative foreign language with two classes per week allocated from the available classes specified by the curriculum. If the learners select other than the English language being their first foreign language, the primary school is obliged to offer English as a

compulsory second foreign language from the 7th grade (see Table 4). However, if English is selected as the first foreign language, the rule of obliging the school to provide another language being the second one taught is not applied.

Tab. 4: First foreign language and English as the second foreign language

Field of education	Subject	Grade Primary education					Grade Secondary education					
		1	2	3	4	Σ	5	6	7	8	9	Σ
First foreign language L2	First foreign language L2			3	3	6	3	3	3	3	3	15
	English as compulsory second foreign language L3								2	2	2	6

Nevertheless, English remains a compulsory foreign language. Motivation to learn another foreign language after English decreases if a school is not focused on supporting the selection and subsequent quality education of the second foreign language. Politicians responsible for education policy do not consider the fact that the need for mobility and plurilingualism is created in regions where also other languages, not only English, are used. Although, the professional associations of language teachers promote the concept of plurilingualism in the Slovak education system, the situation has been made difficult by unfavorable demographic development and ever decreasing interest of students in the teacher's profession (Zemaníková, 2017, p. 106). Regardless of the succession of foreign language learning, the pedagogical research did not pay sufficient attention to teaching the tertiary foreign language. In the current educational approach, the German language is either a second foreign language with two classes per week allocated in secondary education or an extracurricular activity, mostly of commercial character, carried out in the afternoons. Consequently, the German language has indirectly acquired the legislative status of the tertiary language at secondary schools with Slovak as mother tongue since 2011. Although the learners can opt for German as their first foreign language in the primary education, the succession of languages has not experienced major changes.

3 Interdisciplinarity and cooperation in educating foreign language teachers with regard to the plurilingual approach

Future language teachers specializing in tertiary languages should or could certainly be trained during their university studies already, so as to be able to point at the common features and differences between individual languages in a motivating way and thus promote the plurilingual approach in language learning.

Interdisciplinary and cooperation fostering topics in language teacher education with a motivation potential to learning also the tertiary language should be identified. The Slovak universities provide future teachers with the option to study the German language and literature usually in combination with another subject (cf. Zemaníková, 2017, p. 107). It is believed that plurilingual approach to foreign language teacher education can be best implemented via a combination comprising three languages.

Following a literature search in textbooks focused on methodology, the book titles most often included the words *teacher and teaching: The Practice of English Language Teaching, Teacher Knowledge, Learning Teaching, Teaching Children English, etc.* In addition, the following topics were discussed most often: describing the English language (language in use, language as text and discourse, grammar, lexis, sounds of the language), methods, learners, age of the learners, motivation, class management, mistakes and feedback, accuracy and fluency, planning lessons, syllabuses, evaluation, testing, assessment, learner autonomy, etc. Topics overlapping with the German methodology textbooks included: teaching grammar, teaching vocabulary, teaching pronunciation, language skills – listening, speaking, reading, writing. The issue of using mother tongue in foreign language teaching was identified as a frequent question in the preliminary literature research. The topic of

plurilingualism in contrast to monolingual and bilingual approach in foreign language teaching was mentioned by Harmer (2007, p. 132).

4 Education of foreign language teachers in Slovakia

The acceptance of other languages in our society is determined by external factors, such as country-specific language policy (foreign language-friendly atmosphere), specifics of the subject (foreign languages in general) and individual predispositions of the learner. In the school environment, the teacher's personality connects the three components on the *learner – foreign language – country* axis through his/her professional competences, personal predispositions and characteristics.

Teacher education must be closely connected with the latest results of research in neurolinguistics and psycholinguistics. More than ever, the emphasis must be laid on interdisciplinarity and on methods that motivate and stimulate creativity. Likewise, the mother tongue (L1) and the first foreign language (L2) open many opportunities for students to use their own foreign language repertoire (individual multilingualism) in the process of learning the tertiary language (L3) in a meaningful way.

Not only does individual multilingualism have a positive influence on learning other languages (advantages in the cognitive, learning-psychological, metalinguistic, pragmatic area), but it also has its role in the intercultural and creative area, which has been repeatedly proven by empirical studies (Clyne, 2003; Jessner, 2006; Mißler, 1999). According to Marx (2014, p. 8), "the conscious inclusion of different languages in the classroom has [...] multiple positive effects on participating students. Thus, relying on other languages in the first, second, or foreign language classroom leads to increased language awareness, increased language(s) competence (of all languages, whether first, second, native, or foreign), preparation for learning other languages, and increased language learning motivation."

In view of the aforementioned, the teacher training programme should open up more and create topics with interdisciplinary cooperation, it should establish multilingualism concepts at a theoretical level, promote their relevance for teaching German as a foreign language more consistently and supplement them with numerous practical examples from school practice. Humanistically oriented alternative pedagogical concepts (including Gestalt pedagogy) can significantly contribute to the enhancement of competences of pre-service teachers of German as a foreign language with their wide range of methods.

In the following section, we shall focus on a particularly important aspect in the curricular integration of multilingualism, namely on the study programs for pre-service teachers of German as a foreign language at Slovak departments.

4.1 Analysis and comparison of the syllabuses/curricula of teaching disciplines at the departments preparing pre-service teachers of German as a foreign language

For the purpose of the study, legislative documents from five departments were examined, namely those that were cited in the form of syllabuses as official guidelines for all didactic sub-disciplines offered by the departments at present.

The materials studied are formally comparable and analogous in structure: The name of the teaching discipline, scope, method, form (lecture, seminar), recommended number of hours (per week/semester), the number of ECTS credits, recommended semester, level (bachelor's/master's degree), conditions for completion, results of the course, brief annotation/characteristics of the discipline and recommended literature.

After an initial survey of the contents of the submitted materials, the focus was directed on brief characteristics of each subject and the bibliography, with the following objective:

1. search for links,

2. search for topics related to multilingualism or plurilinguism, and their possible application in practice,
3. comparison of the bibliographies.

Based on the analysis, it is possible to state the following:

1. Links and analogies exist in the teaching of linguistic means (vocabulary, grammar, word formation, phonetics and orthography), the promotion and development of receptive and productive skills, in the area of interaction in class (incl. social forms, correcting), motivating, as well as in dealing with media (special emphasis on new media).

It is worth noting that, in addition to the usual range of topics in foreign language teaching, courses in the field of culture and art (literature, music, visual arts, film), intercultural communication, early foreign language acquisition, segments from history, alternative pedagogical concepts (above all Gestalt pedagogy) occur in the teaching of German as a foreign language in various contexts. These areas are to be regarded as content potential for the numerous ways of how to cross borders in order to produce interdisciplinary multilingual-oriented situations.

Consequences: Using case studies, or models, teaching sequences or procedures, one can determine how to connect the principles of foreign language acquisition with the regularities in L1 and L2, and how this realization, evidenced by one's own experiences, leads to increased lesson effectiveness and a significantly more positive relationship with L3.

It is of great importance to address the awareness and transfer of existing language learning strategies in students so as to connect their experience with natural multilingual-oriented teaching. They need to explore similarities and differences between L1, L2 and German as L3 and be able to implement their insights and experience in the language learning process. Gradually, a basis for future multilingual-oriented teaching is created in their minds.

(It cannot be left to the pre-service teacher to figure out what he/she will transfer from other languages and how to mediate a connection between languages).

2. In the analysed syllabuses, the multilingualism concept was not systematically or thematically included. This observation was made on the basis of the short texts provided, which represent a framework of the course contents at the five institutes.

The data obtained do not exclude the fact that the teachers provided at least basic information about the didactics of multilingualism in foreign language acquisition on the theoretical and practical level. Taking into account the specific situation in Slovakia, it is possible to rely on the historical and regional tradition of the Habsburg monarchy (without references to the acceptance of migration-related multilingualism), according to which it was common in Slovakia to have a more or less active command of German and Hungarian, in addition to the Slovak language. The West Slavic language – Czech was one of the two official languages used for communication until the formation of the sovereign Slovak Republic in 1993. Both facts, among other factors, provide a good basis for the multilingualism approach. Slovakia, as one of the smaller states in Europe, has always been shaped by linguistic diversity.

Consequences: To integrate the latest findings of language didactics into the syllabuses, to learn from language comparisons, to be able to select and explain multilingual didactic contexts and to provide examples (students create projects in which they search for traces of German – e.g. in the former medieval mining towns and their colloquial language – *fírhang*, *biglajžňa*, *gánok*, *šibovat' vlaky*, etc., Projects on Linguistic Landscape – Multilingualism in my city) to allow them to enjoy the self-discovering path to learning), online tandem projects to compare languages and facilitate online interaction (Tomášková, 2021).

3. In the bibliography, there are traces of publications in which selected chapters are devoted to the problem of multilingualism. The research has shown that German language departments use specialist books which, at least partially, deal with the question of multilingualism/plurilingualism (Barkowski – Krumm, 2010, pp. 207 – 208; Krumm et al., 2010, pp. 826 – 832; Roche, 2008, pp. 117 – 120). This led the research team to believe that the topic of multilingualism was dealt with and multilingual concepts were discussed. In other recommended authors, neither systemic information nor references to multilingualism concepts were included.

Consequences: Existing bibliography in the programs should be continuously updated and expanded in line with the latest publications.

Preliminary summary:

A. To consistently incorporate the focus on multilingual teaching issues in the study programs. In line with Vicente and Pilypaitytė (2014), it should happen on the following three levels:

1. on the level of language – comparing languages, using existing language skills,
2. on the level of learning – making students aware of learning strategies (cognitive, metacognitive, affective, social in relation to linguistic diversity),
3. on the social level – to consider linguistic diversity and multilingualism as a topic and mindset, i.e. to promote and develop respectful interaction with other languages and cultures among students (have language learning biographies drawn up and discussed).

B. Prepare teaching and learning materials for students of German as a foreign language. It would be desirable to prepare materials for students of teaching German as a foreign language and also materials that can be used when learning another language.

C1. Initiate interviews with experts in didactics from all departments with the aim to learn about their opinions on the topic of multilingualism and to work out common guidelines. Exchange of opinions and a discourse on multilingual orientation in teaching German as a foreign language and in other language subjects can help to intensify the search for suitable solutions.

C2. Interviews with students with the aim of surveying their attitudes and experience. Furthermore, classify and process the collected data according to certain criteria (optimization of teaching German as a foreign language).

D. Cooperate with other faculty members (especially from the English department), seeking inter- and intralingual links together. Publish joint studies, etc.

E. Provide workshops for in-service teachers of German as a foreign language. Provide in-service teachers with the basics of multilingualism concepts, offer and practice learning strategies and techniques.

5 Conclusion

In connection with the research question posed in the introduction (How can L2 language help in teaching a second foreign language, L3, and support its learning process?) several key areas have been identified.

Motivation and learning strategies: Motivating impulses first ought to be integrated into the teaching process, then the learners internalize them. Learning strategies already adopted from teaching and learning English (L2) should be transferred to the learning process of the second foreign language (L3). Similar strategies in both languages have a positive and supportive impact on the learner and, consequently, lead to an autonomous self-reflection of the learner and his/her learning process (cf. Andrášová, 2011, pp. 146-147). This thesis is supported by

numerous structured interviews conducted as part of the Tertiary Language Didactics framework project.

Interlingual transfer and interference errors: In productive skills, attention should be paid to interlingual interference between the mother tongue (L1) and foreign languages (L2, L3, etc.), and also between two or more foreign languages (L2 and L3, L2 and L4, etc.). That might bring up the need of expanding the existing language competences taught in foreign language classes, and other changes in study programs for foreign languages, in order to prepare the teachers of foreign languages for the aforementioned phenomena and use them for teaching L3. Interference errors should be given more attention, and systematic improvements implemented. However, correction of interference errors should be motivating, rather than negative. At the same time, correction of interference errors can contribute to better language awareness that supports a plurilingual approach in teaching multiple foreign languages implemented within a certain period of time.

Contrastive grammar textbooks also provide excellent stimuli for a comparative approach towards L1 and L2, and L2 and L3. Based on pedagogical empirical research, in the analysed educational situation (L1 is Slovak, L2 English and L3 German), we suggest implementation of a course of historical grammar and language development into the curricula for English and German teachers.

In connection with the teaching contents that should be integrated into the education of future teachers of German as a foreign language in the context of support for the plurilingual approach, we suggest to unequivocally adopt the intercultural approach to the didactics of foreign languages, which would allow students participating in teacher training programmes to gain first-hand plurilingual experience. The systematic analysis conducted as part of the presented research has shown that, in terms of the didactics of English as a foreign language and German as a foreign language, there definitely is common ground in teaching receptive and productive language skills in both languages. Finally, it can be concluded that the primary position of the interdisciplinary and inter-field approach represents a solid foundation and a good starting-point for the tertiary language didactics.

Literature:

1. Andrášová, H.: Němčina jako další cizí jazyk po angličtině. In: Janíková, Věra et al.: *Výuka cizích jazyků*. Ediční řada: Pedagogika. Praha: Grada, 2011, pp. 133-159. ISBN 9-788024-735122.
2. Andrášová, H.: Mnohojazyčnost v podmínkách českého školství se zřetelem na výuku němčiny po angličtině. Habilitationsschrift. Brno : Pädagogische Fakultät der MU.
3. Barkowski, H. – Krumm, H.-J.: *Fachlexikon Deutsch als Fremd- und Zweitsprache*. Stuttgart: UTB, 2010. ISBN 978-3-8252-8422-0
4. Danihelová, Z.: *Motivational strategies in foreign language teaching and young learners*. In AD ALTA: Journal of Interdisciplinary Research : recenzovaný mezioborový vědecký časopis. Vol. 8, Issue 2, pp. 43-46, 2018. ISSN 2464-6733.
5. Genzor, J. – Krupa, V.: *Jazyky sveta v priestore a čase*. Bratislava: VEDA SAV, 1996. ISBN 8022404594.
6. Harmer, J.: *The Practice of English Language Teaching*. Pearson. Harlow: Pearson Longman, 2007. ISBN 9781405853118.
7. Harmer, J.: *Essential Teacher Knowledge : Core Concepts in English Language Teaching*. Harlow, Essex: Pearson Longman, 2012. ISBN 9781408268049.
8. Hufeisen, B. – Neuner, G.: *The Plurilingualism Project: Tertiary Language Learning – German after English*. Strasbourg: Council of Europe Publishing, 2004. ISBN 92-871-5145-8.
9. Hufeisen, B. – Neuner, G.: *Mehrsprachigkeitskonzept – Tertiärsprachen – Deutsch nach Englisch*. Strasbourg: Council of Europe Publishing, 2005. ISBN 92-871-5146-6.

10. Hufeisen, B. – Lindemann, B.: *Tertiärsprachen, Theorien, Modelle*. Tübingen: Stauffenburg, 1998. ISBN 3-86057-707-7.
11. Lupták, M. – Kolečáni Lenčová, I.: Závěry a odporúčania z pôdiovnej diskusie na vedeckej konferencii „Cudzíe jazyky v slovenskom vzdelávacom systéme a politika viacjazyčnosti v EÚ“. In: Lupták, M. – Deáková, V. – Danihelová, Z. (eds.) *Cudzíe jazyky v slovenskom vzdelávacom systéme a politika viacjazyčnosti v Európskej únii*. Zvolen: TU, 2012. ISBN 978-80-228-25337.
12. Kolečáni Lenčová, I.: "Das Herz der Sprache klopfen hören": Mehrsprachigkeit heißt nicht nur mehr sprechen. In: *Zeitschrift für Gestaltpädagogik*. Vol.29, No.2, pp. 2-8, 2018. ISSN 1615-6404.
13. Kolečáni Lenčová, I.: *Linguistic landscape and reading comprehension in foreign languages teaching*. In AD ALTA : *Journal of Interdisciplinary Research : recenzovaný medzioborový vedecký časopis.*, Vol. 10, Issue 1, pp. 160-164, 2020. ISSN 1804-7890, ISSN 2464-6733.
14. Krumm, H.-J. – Fandrych, Ch. – Hufeisen, B. – Riemer, C.: *Deutsch als Fremd- und Zweitsprache. Ein internationales Handbuch. Band 1*. Berlin: Verlag Walter de Gruyter, 2011. ISBN 978311025077.
15. Roche, J.: *Fremdsprachenerwerb. Fremdsprachendidaktik*. Tübingen: A. Francke Verlag, 2008. ISBN 978-3-8252-2691-6.
16. Scrivener, J.: *Learning Teaching. The Essential Guide to English Language Teaching*. Macmillan, 2011. ISBN 9780230729841.
17. Tomášková, S.: Deskriptory pre online interakciu: Lingvodidaktické perspektívy virtuálnej komunikácie v cudzom jazyku. In *Humanitné a spoločenské vedy v pregraduálnom vzdelávaní: zborník vedeckých prác a vedeckých štúdií*. Bratislava : Z-F LINGUA, 2021. pp. 108-118. ISBN 978-80-8177-084-5.
18. Widlok, B. – Petravić, A. – Org, H. – Romcea, R.: *Norimberské odporúčania pre včasnú výučbu jazykov*. Munich: Goethe-Institut e. V., 2010. ISBN 978-3-939670-384.
19. Zemaníková, N.: *Germanistik in der Slowakei*. In Miedema, N. (ed.) *Mitteilungen des Deutschen Germanistenverbandes. Themenheft Germanistik in Europa: Forschungs- und Ausbildungsperspektiven*. Vol. 64, Issue 1, pp. 106-110, 2017. ISSN 0418-9426.
20. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52003DC0449>
21. https://europa.eu/european-union/about-eu/eu-languages_en

Primary Paper Section: A

Secondary Paper Section: AM, AI

LABOR MARKET COMPARISON IN THE CONTEXT OF REGIONAL DISPARITIES IN THE SLOVAK REPUBLIC

^aJANA MASÁROVÁ, ^bEVA KOIŠOVÁ, ^cJOZEF HABÁNIK

Alexander Dubcek University of Trenčín, Faculty of Social and Economic Relations, Študentská 2, 911 50 Trenčín, Slovak Republic

email: ^ajana.masarova@tuni.sk, ^beva.koisova@tuni.sk, ^cjozef.habanik@tuni.sk

This paper was supported by the Slovak Ministry of Education's Scientific grant agency VEGA: "Digital economy and changes in the education system to reflect labour market demands". Project registration number: 1/0689/20.

Abstract: The Slovak Republic is characterized by regional disparities, which are also reflected in the labor market. The aim of our paper is to examine the development of the Slovak labor market and evaluate the level of regional labor markets on the basis of selected indicators in the years 2001-2019. We examine the situation on the labor market in the regions of the Slovak Republic on the basis of the development of economic activity, employment, unemployment, average wage and the proportion of employed with tertiary education. To evaluate regional disparities in our article, we use two methods: the scoring method and the method of a uniform normalized variable. With both methods used, the Bratislava region was best placed in 2001 and in 2019. The worst evaluation in 2001 was achieved by the Nitra region and in 2019 by the Prešov region.

Keywords: labor market, regional labor market, indicators of regional disparities, scoring method, method of uniform standardized variable.

1 Introduction

Resolving regional disparities is still a major problem in the Slovak Republic. Labor market problems in terms of regional differences are attractive topics addressed by many authors, such as Bezák (2001) or Škrovánková (2018), who focused on examining indicators of regional disparities and their impact on the labor market. Slovakia is still one of the EU countries with the highest regional differences in performance and productivity indicators, and in the main labor market indicators (Neradný, Lalinský, 2016).

The labor market is a regulated market and is characterized by an imbalance between the amount of work offered by the population and the amount of work required by companies and public administration organizations. It works with the rarest capital of the economy, and that is human capital. Work force is one of the most important factors of production because it contributes to the economic growth of a state or region (Simionescu et al., 2016; Cyrek, 2017). The accession of the Slovak Republic to the EU and the implementation of important reform changes that the Slovak economy had to go through at the beginning of this century and the onset of the boom in the world economy brought a significant inflow of foreign direct investment into the Slovak economy. It also affected labor market developments and helped reduce unemployment.

When examining balance or imbalance in the labor market, the main role is played by employed and unemployed persons, who make up the economically active population. Unemployment is a situation on the labor market where people who want to work and can work cannot find work. It arises as a result of a whole set of phenomena and processes in the economic, social and political spheres. Unless it becomes mass, it is not considered a serious economic or social problem. It is usually based on the fact that the existence of unemployment is actually a natural phenomenon and an attribute of a free society based on a market mechanism and democracy (Rievajová et al., 2006). Unemployment is a natural part of market and mixed economies and can even be beneficial for economic growth and labor productivity. On the other hand, a high level of unemployment has very adverse economic and social consequences, for the whole economy, but also for the individual regions affected by this unemployment. For this reason, it is also necessary to examine the development and unemployment and the labor market in general in individual regions.

Many authors, such as Goodman (1970) or Fischer and Nijkamp (1987) and others, have defined the regional labor market and are based on a common idea. Under the term regional labor market, we imagine a region in which there is territorial harmony (territorial agreement) between labor demand and supply, which is reflected in the fact that economically active persons living in a given region usually work in this region and, if necessary, they are also looking for a job. On the demand side, compliance is reflected in the fact that most employees of companies and organizations located in the region come from the same region and the economically active population of the region usually fills vacancies or new jobs. Bezák (2001) the term regional labor market means a territory, a market in which the decisive part of real and potential flows for work is realized within the region and flows flowing across its borders are not significant. In addition to economic, social disparities arise there, which are associated with the population, health care, education, employment, unemployment, social protection, family accounts, crime and culture (Michálek, 2014).

In the labor market of the Slovak Republic, we can observe significant regional differences, which result from different primary potential (location and natural conditions), from various development possibilities (natural resources, tourism), economic structure (industry), and demographic differences and from the level of infrastructure. An important aspect of these differences is also the significantly higher economic level of the Bratislava region compared to other regions of the Slovak Republic, which means that the inhabitants of more distant regions also come to work in the Bratislava region.

The aim of our paper is to examine, compare and evaluate the development of the labor market in the regions of the Slovak Republic in the years 2001-2019.

2 Materials and Methods

In professional and scientific work dealing with regional disparities and regional development, we encounter several studies that offer a wide selection of indicators depending on the set goal. This fact conditioned a wide and differentiated selection of indicators of regional disparities for individual authors. According to Sloboda (2006), the most frequently used indicators of regional disparities monitored in Slovakia are GDP, unemployment rate, average wage, economic activity rate.

Matlovič et al. (2008) worked with ten selected socio-economic indicators and evaluated their development within regional disparities (GDP per capita, labor productivity, monthly employee costs, employment rate, unemployment rate, net monthly income per person, net monthly expenditure per person, average monthly wage, gross birth rate, completed dwellings). Other authors (Rajčáková, Švecová, 2011) used indicators, partial indicators of demographic profile, employment of the population, labor market, production performance, infrastructure equipment and a complex socio-economic level in the evaluation of disparities in Slovakia.

To assess the social and economic development of Granberg et al. (2000) used a methodology that includes basic indicators for nine evaluation units. Researchers Andreev et al (2008) developed a more extensive system of indicators, consisting of a block of key indicators and a block of other indicators. According to them, the proposed blocks of indicators characterize the development of the social, economic and environmental spheres of the region. Syroezhin (1980) proposed the setting of dynamics indicators and proved that the dynamic characteristics are in order, which allows their mutual comparison, even if the analyzed indicators are incomparable in the statistical format.

The aim of our paper is to examine the development of the Slovak labor market and evaluate the level of regional labor markets on the basis of selected indicators in the years 2001-2019. We will consider NUTS3 regions as regions of Slovakia, namely: Bratislava region (BA), Trnava region (TT), Trenčín region (TN), Nitra region (NR), Žilina region (ZA), Banská Bystrica region (BB), Prešov region (PO), Košice region (KE).

In our article, we use the indicators listed in Table 1 to evaluate the level of the labor market in the regions of the Slovak Republic.

Tab. 1: Selected indicators and sources of data

Indicator	Source of data
economic activity rate (%)	VBD_SK_WIN:pr3102qr
employment rate (%)	VBD_SK_WIN:pr3102qr
unemployment rate (%)	VBD_SK_WIN:pr3102qr
average wage (Euro)	VBD_SK_WIN:np3110rr
proportion of employed with tertiary education (%)	VBD_SK_WIN:pr3116qr

In the paper, the methods of analysis, comparison, synthesis and scoring method were employed. The method of analysis was used to analyse the labour market indicators in the regions of the Slovak Republic. The method of comparison was used to compare the selected indicators in the Slovak regions and to compare the results of the two multicriteria methods used. The method of synthesis was used to draw conclusions resulting from the analysis.

In our article, we use two methods to evaluate regional disparities: the scoring method and the uniform normalized variable method. The scoring method is one of the simple multicriteria methods. Its advantage is the ability to summarize indicators captured in different units into a single synthetic characteristic, which is a dimensionless number. Its disadvantage is that it is based on the absolute variability of indicators, while it cannot affect their relative variability (Michálek, 2012). In scientific works, the scoring method is used for various purposes. As a method of evaluating the level of regions on the basis of several indicators and subsequently evaluating regional differences, it is mentioned, for example, by Kutscherauer et al. (2010), Tuleja (2010), Svatošová and Novotná (2012), Hamada (2014) and others.

In the scoring method, points are awarded to individual regions on the basis that the region with the best value of the indicator receives 100 points, and the other regions receive points as follows:

- if the maximum value is the best value (economic activity rate, employment rate, average wage, proportion of employed with tertiary education):

$$p_{ij} = \frac{v_{ij}}{v_{jmax}} \times 100 \quad (1)$$

- if the minimum value is the best value (unemployment rate):

$$p_{ij} = \frac{v_{jmin}}{v_{ij}} \times 100 \quad (2)$$

where:

v_{ij} = the value of j -th variable in the i -th region

v_{jmax} = highest value of the j -th variable

v_{jmin} = lowest value of the j -th variable

p_{ij} = the scores of the i -th region for the j -th variable.

Next, the integral variable d_i , as the arithmetic average of the points for the indicators set for each region is calculated. The best results of observed variable reaches the region in which the integral indicator d_i reaches the maximum value.

The second method - the method of uniformly normalized variable is characterized by the allocation of points to individual regions through the technique of uniform normalization, which was used, for example, by Madajová, Michálek and Podolák (2014), Bucher (2016). In this way, the values of the indicators in different units of measurement are standardized to a uniform scale of $\langle 0, 1 \rangle$ as follows:

- if the maximum value is the best value (economic activity rate, employment rate, average wage, proportion of employed with tertiary education):

$$Z_{ij} = \frac{X_{ij} - X_{jmin}}{X_{jmax} - X_{jmin}} \quad (3)$$

- if the minimum value is the best value (unemployment rate):

$$Z_{ij} = \frac{X_{jmax} - X_{ij}}{X_{jmax} - X_{jmin}} \quad (4)$$

where:

X_{jmax} = highest value of the j -th variable,

X_{jmin} = lowest value of the j -th variable,

X_{ij} = the value of j -th variable in the i -th region,

Z_{ij} = the scores of the i -th region for the j -th variable.

Next, the integral variable Y_i , as the arithmetic average of the scores for the indicators set for each region is calculated. The best results of observed variable reaches the region in which the integral indicator Y_i reaches the maximum value.

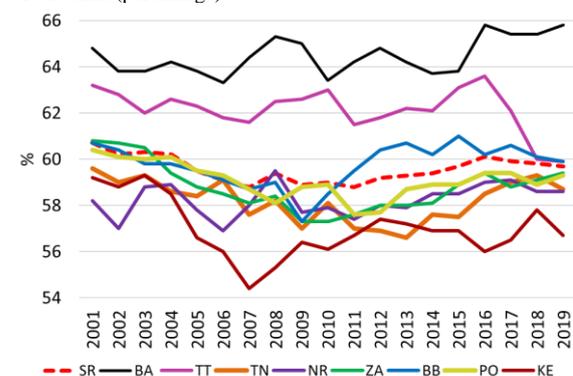
3 Results and Discussion

We will examine the situation on the labor market in the regions of the Slovak Republic on the basis of an examination of the development of economic activity, employment, unemployment, the average wage and the share of workers with tertiary education. To evaluate the situation on the labor market in individual regions of the Slovak Republic, we will use the scoring method and the method of an even standardized variable. The results of both methods are then compared to determine compliance, respectively differences in their results.

3.1 Development of the labor market in the regions of Slovakia

The starting point for examining the situation on the labor market is the evaluation of economic activity, i. summary of employed and unemployed persons. We evaluate economic activity in the regions of the Slovak Republic using the economic activity rate of population indicator aged 15 and over in percentage. Its development in the regions of the Slovak Republic is shown in Figure 1.

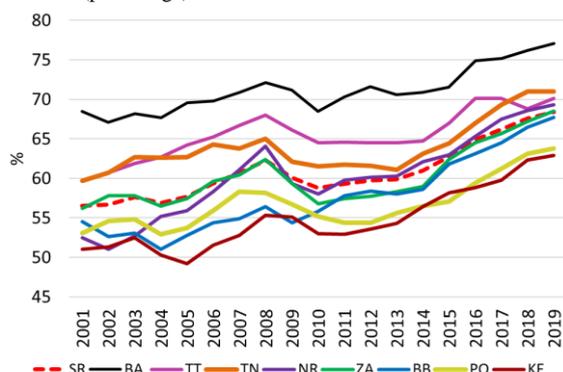
Figure 1: Development of economic activity rate in the regions of Slovakia (percentage)



Source: Statistical Office of the Slovak Republic (2021), own processing.

In the observed period, the development of the rate of economic activity in the regions of the Slovak Republic is very volatile. The highest rate of economic activity in the whole period is in the Bratislava region, in 2016 and 2019 up to 65.8%. The Trnava region also showed values higher than the Slovak average, but after 2016, there was a decline in the rate of economic activity. The lowest rate of economic activity is in the Košice region; in 2007 it was only 54.4%. In 2019, compared to 2001, the rate of economic activity was higher only in the Bratislava region and the Nitra region. Another examined indicator of the labor market is employment, which significantly affects the living standards of the population, but also the economic performance of the region. We examine employment using the indicator of the employment rate of persons aged 15-64 (percentage), its development in the regions of the Slovak Republic is shown in Figure 2.

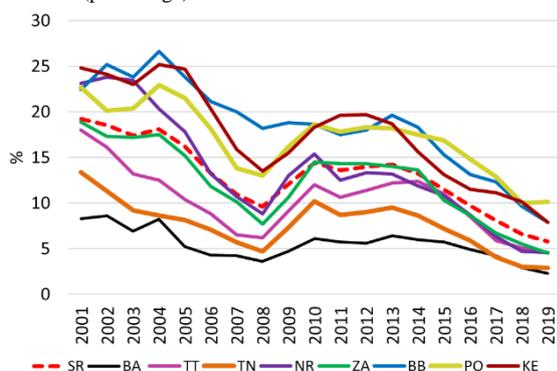
Figure 2: Development of employment rate in the regions of Slovakia (percentage)



Source: Statistical Office of the Slovak Republic (2021), own processing.

The development of employment can be described as fluctuating, with an increasing tendency. The highest employment rate is in the Bratislava region; in 2019 it reached up to 77.1%. Employment in the Trnava region was the second highest, but in 2018, its decline was recorded. Trenčín region is also one of the regions with a higher employment rate; in 2019 it reached the level of 71%. The regions with the lowest employment rates were Košice region and Prešov region. The most significant increase in the employment rate in 2019 compared to 2001 was recorded in the Nitra region, up to 16.8 p.p. Another indicator examined is unemployment, which we evaluate using the unemployment rate in percentage. Its development in the regions of the Slovak Republic is expressed in Figure 3.

Figure 3: Development of unemployment rate in the regions of Slovakia (percentage)



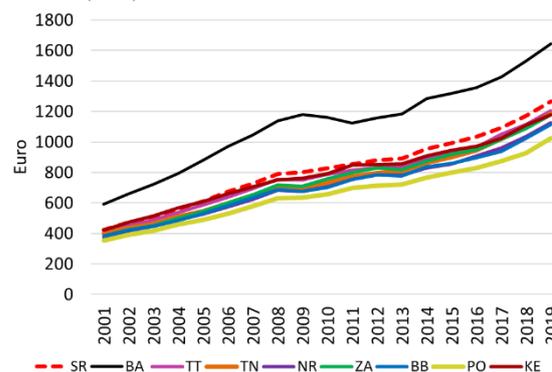
Source: Statistical Office of the Slovak Republic (2021), own processing.

Unemployment in the regions of Slovakia was very high in the first years of the observed period, in many regions it was higher than 20%. However, its development was positive, until 2008

unemployment fell, then due to the economic crisis, and after 2013 it is recorded again. In 2019, unemployment in all regions of Slovakia reached the lowest values of the entire period under review. The lowest unemployment was in Bratislava region, in 2019 only 2.3%, in Trenčín region 2.9%. Unemployment below 5% in 2019 was also achieved by regions: Trnava region, Nitra region, Žilina region. If we compare the unemployment rate in the first and last year, the largest decrease in unemployment occurred in the Nitra region (by 18.5 p.p.) and in the Košice region (by 16.9 p.p.).

An important indicator of the labor market is wages. It is the price of labor, and the living standards of the population, the amount of their consumption and savings depend on it. The development of the average monthly wage in the regions of the Slovak Republic is shown in Figure 4.

Figure 4: Development of average wage in the regions of Slovakia (Euro)

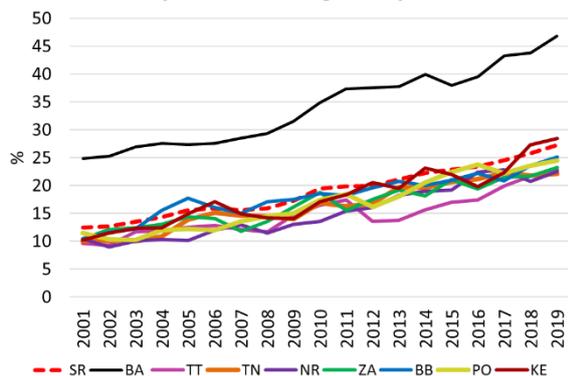


Source: Statistical Office of the Slovak Republic (2021), own processing.

In the period 2001-2019, a significant increase in the average monthly wage was recorded in the regions of the Slovak Republic, by an average of 198.8%. In Figure 4, we can observe an increase in average wages, with the exception of a slight decrease in average wages in crisis years. Significantly, employees in the Bratislava region achieve the highest wages. These wages increase the average wages in the Slovak Republic because the wages of employees in other regions are below the Slovak average (except for the Košice region in 2002-2004).

Employees from the Prešov region have the lowest wages, accounting for only 62.3% of wages in the Bratislava region. During the period under review, average wages increased the most in the Bratislava region, from 591.7 Euro to 1646 Euro. The average wage in the Prešov region represented in 2011 60% of the average wage in the Bratislava region, in 2019 it was 62%, which indicates a slight narrowing of the differences in the level of the average wage in the regions of Slovakia. The fifth selected indicator of the labor market is the share of employees with tertiary education, its development in the regions of the Slovak Republic is shown in Figure 5.

Figure 5: Development of proportion of employed with tertiary education in the regions of Slovakia (percentage)



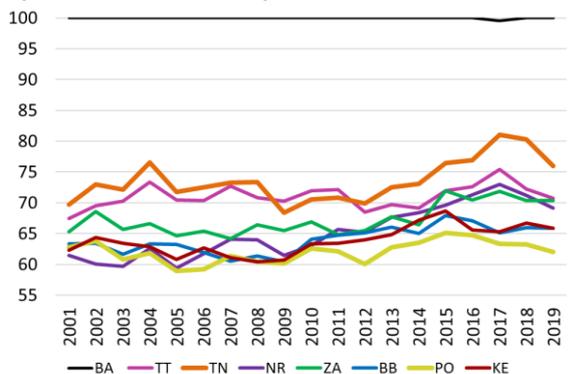
Source: Statistical Office of the Slovak Republic (2021), own processing.

The share of employees with tertiary education has fluctuated, with a growing trend. Figure 5 shows the huge distance of the Bratislava region from other regions of Slovakia. The share of workers with tertiary education in the Bratislava region increased from 24.8% in 2001 to 46.8% in 2019. The differences between other regions are not very significant. The lowest share of workers with tertiary education was in Trnava region and Nitra region, in 2019 in Trenčín region. Apart from the Bratislava region, the highest increase in the share of tertiary education was recorded in the Košice region (by 18.3 p.p.) and the Banská Bystrica region (by 14.7 p.p.)

3.2 Evaluation of the situation on the labor market in the regions of Slovakia

We evaluated the situation on the labor market in the regions of the Slovak Republic using the scoring method and the method of an evenly standardized variable. The results of the assessment of the level of the labor market determined by the scoring method are shown in Figure 6.

Figure 6: Results of the scoring method

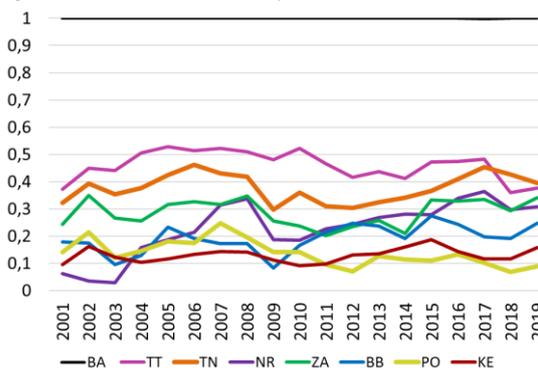


Source: own calculating.

The Bratislava region achieved the best rating in the entire monitored period, when, with the exception of 2017, it reached the maximum possible value of 100 points. The Trenčín region follows with a significant gap, in the years 2009-2011 the Trnava region.

The lowest score in the first three years was given to the Nitra region, in 2007 to the Banská Bystrica region, and in the last years to the Prešov region. Applying the method of a uniform standardized variable to assess the situation of the labor market in the regions of the Slovak Republic, we have reached the results shown in Figure 7.

Figure 7: Results of the uniformly normalized variable method



Source: own calculating.

The method of evenly normalized variable shows as significantly the best situation on the labor market in the Bratislava region. The second-best region in most years was Trnava region, while its score in only a few years exceeded 0.5. In the last two years, the second-best evaluation of the labor market has been achieved by the Trenčín region. The lowest rating by this method in 2001-2003 was in Nitra region, in the following years in Kosice region, in 2009 in Banská Bystrica region, in other years in Prešov region.

3.3 Comparison of the results of the scoring method and the method of a uniformly normalized variable

Based on the recalculations made in section 3.2, we can compare the final assessment of the labor market in the regions of the Slovak Republic found through both selected methods. We compare the evaluation in the first year of the observed period - 2001 (Tab. 2) and in the last year of the observed period - 2019 (Tab. 3).

Tab. 2: Evaluation of the labor market in the regions of the Slovak Republic in 2001

method	scoring method		uniformly normalized variable method	
	d_i	rank	Y_i	rank
BA	100	1.	1	1.
TT	67,43	3.	0,372	2.
TN	69,70	2.	0,322	3.
NR	61,43	8.	0,063	8.
ZA	65,26	4.	0,244	4.
BB	63,37	5.	0,179	5.
PO	62,73	6.	0,142	6.
KE	62,34	7.	0,096	7.

Source: own calculating.

In 2001, the results of the evaluation of the situation on the labor market by both methods were almost the same, the best region was the Bratislava region, the worst was the Nitra region. Based on the determination of the order of individual regions, only the difference in the location of the Trnava region and the Trenčín region is obvious.

Tab. 3: Evaluation of the labor market in the regions of the Slovak Republic in 2019

method	scoring method		uniformly normalized variable method	
	d_i	rank	Y_i	rank
BA	100	1.	1	1.
TT	70,76	3.	0,376	3.
TN	75,98	2.	0,395	2.
NR	69,10	5.	0,309	5.
ZA	70,32	4.	0,341	4.
BB	65,84	7.	0,247	6.
PO	62,05	8.	0,089	8.
KE	65,87	6.	0,158	7.

Source: own calculating.

Also in 2019, significantly the best values of integral indicators were recorded in the Bratislava region. Then Trenčín region and Trnava region. When comparing the evaluations by both methods, we find the same order of regions, with the exception of the Banská Bystrica region and the Košice region.

From our research, it is clear that in 2001 was the worst situation on the labor market in the Nitra region. During the period under review, he improved his position, and reached 5th place. On the contrary, the worst situation on the labor market in 2019 was in the regions of Prešov region, Košice region, Banská Bystrica region.

4 Conclusions

In our article, we focused on examining and evaluating the situation on the labor market in the regions of the Slovak Republic. We monitored the development of economic activity, employment, unemployment, average wage and the share of workers with tertiary education. These are factors that significantly affect the labor market in the regions of the Slovak Republic. The best results in economic activity were recorded in the Bratislava region and the worst results were achieved in 2007 in the Košice region, only 54.4%. The development of employment in the years 2001 to 2019 was fluctuating, but with an increasing tendency.

The highest employment rate in the Bratislava region is 77.1%, but in the last year (2019), the Trenčín region also exceeded 70%. The most significant increase in the employment rate in 2019 compared to 2001 was recorded in the Nitra region, up to 16.8 p.p. The development in terms of unemployment was positive.

In the first years, Slovak regions struggled with a very high unemployment rate (more than 20%). But the development of this indicator was positive until 2008, when due to the economic crisis, its value grew again. After 2013, its decline is recorded again, and in 2019, unemployment in all regions of Slovakia reached the lowest values of the entire period under review.

Another important indicator of the labor market is wages. Its average value in the observed period increased significantly in all regions of the Slovak Republic. Average wages in this period increased by an average of 198.8%. Employees in the Bratislava region achieve the highest wages. We must state that these wages significantly increase the average wages in the Slovak Republic, because the wages of employees in other regions are below the Slovak average.

The last monitored indicator was the share of employees with tertiary education. Even in this case, the values in the observed time series developed fluctuating, but with an increasing trend. In addition to the Bratislava region, the highest increase in the share of tertiary education was also recorded in the Košice region (by 18.3 pp) and the Banská Bystrica region (by 14.7 pp).

To evaluate the situation on the labor market, we used two methods: the scoring method and the method of a uniformly normalized variable. The scoring method is one of the simplest methods of multi-criteria evaluation and this simplicity is one of its great advantages. For this reason, it is widely used in the public sector. The standardized variable method is also a simple method; it is used more for evaluation based on quantitative criteria, in contrast to the scoring method, which is suitable for evaluation based on qualitative criteria.

We compared the results of both methods in 2001 and the Bratislava region was in the first place. In the scoring method, the Trenčín region came in second and the Trnava region came in third. In 2001, the other regions ranked equal in both methods. In 2019, the best region was again the Bratislava region in both examined methods. The change occurred in only two regions, but that year it was a weaker region. In the scoring method, the Košice region was ranked sixth and the Banská Bystrica region was ranked seventh. Using the standard variable method, the

order of the two regions was changed. The weakest region was the Nitra region in 2001 and the Prešov region in 2019.

The article deals with the development of labor market determinants in the regions of the Slovak Republic from 2001 to 2019 and their evaluation on the basis of two multicriteria methods. This is the period just before the outbreak of the Covid-19 pandemic, when the economy began to fall into depression. Against the background of the evaluation of development tendencies and problems of the economy, the shock was already seen, which caused a lot of changes. Unfortunately, due to the availability of statistics, we have not yet been able to capture the first data in regional statistics and analyze the effects of the pandemic on regional disparities. This period will be the subject of research activities in the following periods.

Literature:

1. Andreev, A.V., Borisova, L.M. & Pluchevskaya, E.V.: *Bases of regional economy*. Russia, Moscow: KNORUS, 2008.
2. Bezák, A.: O regionálnych trhoch práce, nových krajoch a tokoch nezamestnaných. *Geografický časopis*, 2001, 53 (4), 295–305.
3. Bucher, S.: *Konkurencieschopnosť a regionálne disparity v Európe: Vybrané ekologické, sociálne a ekonomické indikátory*. Košice: Univerzita Pavla Jozefa Šafárika v Košiciach, 2016. 98 p. ISBN 978-80-8152-447-9.
4. Cyrek, M.: Social efficiency of employment in three sectors - a comparison of Polish regions. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 2017, 12(3), 417–432. DOI: <https://doi.org/10.24136/eq.v12i3.22>.
5. Fischer, M.M. & Nijkamp, P.: Spatial labour market analysis: relevance and scope. In Fischer, M. M., Nijkamp, P. (eds.): *Regional labour markets*. Amsterdam (North-Holland), 1987, pp. 1–33.
6. Goodman, J.F.P.: The definition and analysis of local labour markets: some empirical problems. *British Journal of Industrial Relations*, 1970, 8, 179–196.
7. Granberg, A.G., Busygina, I.M. & Vvedensky, V.G.: Regional development: the experience of Russia and the European Union. *ZAO Publishing house Economics*, 2000, 435(4), 335–338.
8. Hamada, R.: Vybrané spôsoby a metódy merania a hodnotenia regionálnych disparít. *Regionálni rozvoj medzi teorií a praxí*, 2014, 3 (1), 21–34.
9. Kutscherauer, A., Fachinelli, H., Hučka, M., Skokan, K., Sucháček, J., Tománek, P. & Tuleja, P.: *Regionální disparity. Disparity v regionálním rozvoji země – pojetí, teorie, identifikace a hodnocení*. Ostrava: VŠB-TU Ostrava, 2010. 236 p. ISBN 978-80-248-2335-5.
10. Madajová, M., Michálek, A., & Podolák, P.: The level of regional disparities in Slovakia and its changes in 2001–2011. *Geographia Slovaca* 28/2014, 127–152.
11. Matlovič, R., Klamár, R. & Matlovičová, K.: Vývoj regionálnych disparít začiatkom 21. storočia na Slovensku vo svetle vybraných indikátorov. *Regionálni studia*, 2008, 2, 2–13.
12. Michálek, A.: Vybrané metódy merania regionálnych disparít. *Geografický časopis / GEOGRAPHICAL JOURNAL*, 2012, 64 (3), 219–235.
13. Michálek, A.: Selection of indicators of regional disparities. *Geographia Slovaca*, 2014, 28, 23–35.
14. Neradný, Š. & Lalinský, T.: Strednodobý vývoj regionálnej konvergenencie výkonnosti a ukazovateľov trhu práce na Slovensku a v EÚ. *Biatic*, 2016, 24(5), 21–26.
15. Rajčáková, E. & Švecová, A.: Regionálna štruktúra Slovenska v posledných troch desaťročiach. *Acta Regionalia et Environmentalica*, 2011, 8(2), 29–37.
16. Rievajová, E. et al.: *Teória a politika zamestnanosti*. 1. vyd. Bratislava: Ekonóm, 2006. 286 s. ISBN 80-225-2263-5.
17. Simionescu, M., Ciuiu, D., Bilan, Y., & Strielkowski, W.: GDP and net migration in some eastern and south-eastern countries of Europe. A panel data and Bayesian approach. *Montenegrin Journal of Economics*, 2016, 12(2), 161–172.
18. Sloboda, D.: *Slovensko a regionálne rozdiely. Teória, regióny, indikátory, metódy*. Bratislava: Konzervatívny inštitút M. R. Štefánika, 2006.

19. Statistical Office of the Slovak Republic: DataCube. 2021. http://datacube.statistics.sk#!/lang/sk/?utm_source=susr_portalHP&utm_medium=page_database&utm_campaign=DATAcube_portalHP
20. Svatošová, L. & Novotná, Z.: Regional Disparities and their Development in Czech Republic over 1996-2010 Years, *Acta Universitatis Bohemiae Meridionales*. 2012, 15(1), 103-110.
21. Syroezhin, I.M.: *Perfection of the system of indicators of efficiency and quality*. Russia, Moscow: Economics, 1980.
22. Škrovánková, K.: Regional differences on the labour market, reasons, approaches to the solution, government support. *RELIK 2018: Reproduction of human capital - mutual links and connections*. The 11th international scientific conference Prague: University of Economics, 2018.
23. Tuleja, P.: Praktická aplikace metod hodnocení regionálních disparit. *Acta academica karviniensis*, 2010, 1(2010), 496-509.

Primary Paper Section: A

Secondary Paper Section: AH

UKRAINE'S NATIONAL SECURITY POLITICAL AND LEGAL SUPPORT UNDER DEMOCRATIC TRANSITION CONDITIONS

^aANDRIY DATSYUK, ^bRENA MARUTYAN, ^cYURIY MELNYK

^{abc}*Taras Shevchenko National University of Kyiv*
01601, 64/13, Volodymyrska Street, City of Kyiv, Ukraine,
interdepartmental research center for combating organized
crime under the National Security and Defense Council of
Ukraine
03035, City of Kyiv, 1, Solomianska str., Ukraine
email: ^adapolit@ukr.net, ^brenata_kiev@i.ua, ^cyum156@ukr.net

Abstract: The essence and elements of the Ukraine's national security political and legal support process are researched in the paper. It has been proved that the democratic transition process in Ukraine led up to a change in approaches of understanding the essence of national security and practice of its support. Nowadays, a value-oriented approach plays a significant role in scientific thought and at the legislative level. It is deduced that democratic changes in the security and defense sector have not been completed and finally implemented in the process of implementing national security policy. Problems of economic and ideological nature, the unwillingness of society to systemic transformation, the polarization of political actors as for domestic and foreign policy priorities is often the obstacle to democratic transition in the field of national security.

Keywords: civil society, democracy, democratic transit, public administration, national security, national stability.

1 Introduction

The theory of national security has undergone a rather long time of development, and understanding of the security essence was reflected in certain approaches to the practice of ensuring it. Understanding of the security essence and choosing of its ensuring methods is inseparably connected with practical policy, dominating values in a society, and the type of a political regime. Ukraine has been in the process of changes its political system since it gain independence after the collapse of the USSR. And those changes not always were democratic. The retreat from the totalitarian and later authoritarian Soviet political system did not mean for Ukraine the final approval of the democracy principles, particularly regarding approaches of national security support. The democratic transformations of the period 2005-2009 were replaced by the policy of the authoritarian regime of ex-President V. Yanukovich. After its overthrow as a result of the Revolution of Dignity in 2014, during which security forces used force of arms against civilians, the process of democratic transition resumed - the transition from an authoritarian to a democratic form of government, accompanied by appropriate institutional changes. This was reflected in the change of Ukraine's security and defense sector structure, as well as in regulatory support of national security.

2 Research Methods

The following scientific methods were used in the paper: systematic, synergetic, logical-dialectical, comparative, structural-functional, formalization, idealization, modeling, generalization. In particular, systemic, structural-functional, comparative methods became the basis of the research and allowed to achieve the following: to find out the elements, state and directions of political and legislative support of the national security of Ukraine, to systematize scientific sources, legislative and regulatory acts; specify the terms and concepts of public administration in the field of national security. The synergetic method allowed to study the phenomenon of civil society as a self-organizing process, characterized by the emergence of new ordered structures, and to study the national security system as a complex dynamic system in different states: from the state of balance to bifurcation. The method of generalization was used to generalize the processed materials in order to formulate conclusions and recommendations based on the results of the research.

3 Research Results

Until the early 1990s, the greatest threat to the world community was considered the confrontation between two superpowers - the

USSR and the United States, which could lead to a global thermonuclear conflict. Considering the dominant nature of the external (military) threat, most scientists focused on the problem of state defense potential. Under the conditions of the Cold War, the "policy of deterrence" was important in support of the national and international security, the essence of which, according to V. Kaufman is "a kind of policy to warn a potential adversary about the risk that threatens him in the event when he tries to implement his planned measures ... "[5].

The approach in which national and state security were equated was dominating in the USSR. The priority of state interests was being determined. According to such approach the national security does not exist outside the state influence.[8]. The geopolitical changes in the end of the twentieth century, associated with the collapse of the USSR and the termination of the Warsaw Pact Organization, the finally unresolved ethnopolitical conflicts in Africa, the Middle East, on the territory of the former Soviet Union and Yugoslavia (Kosovo) necessitated new approaches to international and national security problems. A kind of threats vector shift to the domestic sphere has taken place, which, in turn, determines the need to consider national security in the context of not only external but also internal threats. In addition, as Ukraine's experience shows, internal vulnerabilities can be used in the process of an external military aggression. The current situation in the world is characterized by a string of threats and related with them security issues that are not limited to its external military component: emergencies of various kind, including pandemics, organized crime, cyberterrorism, illegal migration, and so on. At the same time, military threats remain in the system of international relations.

All this factors necessitated a broader understanding of national security and separating of its economic, political, informational, environmental, and humanitarian components. Thus, the law "On the Fundamentals of National Security" (adopted in 2003 and repealed in 2018)[9] defined national security as the protection of vital interests of an individual and citizen, society and the state, which ensures sustainable development of society, timely detection, prevention and neutralization of real and potential threats to national interests in various spheres. Characteristically, there are three main objects of national security: an individual (his rights and freedoms), the society (its spiritual, material, and natural values) and the state (its constitutional order, sovereignty, territorial integrity and inviolability).

Within this approach, there is a broader understanding of national security, which is not limited to its state component. At the same time national interests of a vital nature are emphasised. Until 2014 the problem of national values in supporting of national security has been investigated in the works of Ukrainian scientists, but the emphasis was on national interests[1, p.16].

The "Revolution of Dignity" was not only an important stage of democratic transition in Ukraine, but also led to the enshrinement of the course to European and Euro-Atlantic integration in the Constitution. National values are beginning to play a greater role in national security understanding. This is a value-oriented approach that developed within the framework of Western national security theory. Democratic values of society protection is emphasized. Among the basic values there are political independence, economic prosperity, territorial integrity, equality, human rights and freedoms, development, justice, and so on. The axiological aspects of national security are emphasized in contemporary researches[2].

The current Law on National Security of Ukraine (2018) defines national security as "protection of state sovereignty, territorial integrity, democratic constitutional order, and other national interests of Ukraine from real and potential threats." In this

regard, it should be noted that state sovereignty, territorial integrity, democratic constitutional order are precisely national values, and their protection belongs to national interests. National interests, as in the previous law, are defined in the context of vital interests of an individual, society and the state.

The process of transition to democracy results in corresponding changes in the structure of the security and defense sector of Ukraine. In the context of this article, it is reasonable to use the approach of the modern transitology founder, American political scientist D. Rastow (1970), who considered democratic transition as "a period of time immediately before the transition to immediately after the transition to democracy" and identified its three phases:

- 1) the preparatory phase (the process of various socio-political forces struggle);
- 2) the decision-making phase (institutionalization of democracy mechanisms: adoption of relevant regulations, coordination of democratic procedures, consensus as for democratic methods of struggle);
- 3) the habituation phase (new democratic rules, procedures, and values assimilation by society).

According to this approach, Ukraine, like its security and defense sector, is in the transition process from the second to the third phase of democratic transit. The fact is that a number of reforms have been carried out, some of which, including the reform of the judiciary and law enforcement systems, have not been completed. Vestiges of the past are present in the practice of national security support: doubling of powers of different entities and conflicts between them, critical dependence of the security and defense sector on political changes and the ruling political elite interests, maintaining a high level of corruption, insufficient efficiency of interaction between state and non-state entities supporting national security. In other words, the democratic changes declared and partly adopted by the legislation and the entities in the security and defense sector, are still not in practice (the phase of habituation is at the initial stage).

It could be explained by a longlasting period of hybrid political system development[3] which is characterised by "facade" superficial changes of an artificial nature. In this case the transition to a democratic system cannot take place and be quickly and effectively perceived by society.

Ukraine moved from the military to the sectoral principle of forming the system of national security only in 2018. The military organization of the state was directly aimed at solving of problems of the state interests protecting from external and internal threats and had not institutions of civil society. On the other hand, the Security and Defense Sector of Ukraine includes both government entities, which activities are aimed at protecting Ukraine's national interests from threats and are under democratic civilian control, and citizens and public associations that voluntarily participate in ensuring national security.

The state law enforcement system has suffered sweeping changes. To replace the militia the National Police was created, the Internal Military Forces of the Ministry of Internal Affairs were liquidated, and the National Guard of Ukraine was formed as a military formation with law enforcement functions, which has dual subordination. The National Guard reports to the Minister of the Internal Affairs in administrative and military-political aspects and to the Ministry of Defense in cases of personnel recruitment by conscription and performance of state defense functions under the legal regime of martial law. Double subordination reduces a risk level of using the National Guard forces in political struggle.

For corruption control the Specialized Anti-Corruption Prosecutor's Office (SAP) and the National Anti-Corruption Bureau of Ukraine (NABU) were established. A number of steps have been taken to eliminate doubling of law enforcement powers. The pre-trial investigation functions of the prosecutor's

office were transferred to NABU and other law enforcement entities. A draft law has also been elaborated, which envisages the transfer of pre-trial investigation functions from the SSU (Security Service of Ukraine) to the SBI, NABU, the Police and the Bureau of Economic Security within their competences by the end of 2022.

At the same time, the State Bureau of Investigation and the National Anti-Corruption Bureau of Ukraine in accordance with Art. 12 of the current law "On National Security of Ukraine" is not included in the security and defense sector entities. Although they perform important functions to counter threats. For example, the main function of such a law enforcement entity as NABU is to control corruption at the highest level of public administration (category A civil servants). At the legislative level corruption is recognized as one of the greatest threats to Ukraine's national security. SBI therefore is a law enforcement entity that investigates criminal proceedings against judges, law enforcement officers, and civil servants in three categories. The non-inclusion of these entities in the security and defense sector can be explained by the fact that according to this law the general management of the security and defense sector is carried out by the President of Ukraine. At the same time NABU and SBI are legally independent bodies and should not be subordinate to the President.

The legal support of national security in Ukraine should be understood as a system of regulations aimed to create a set of measures that ensure the protection of national values and the realization of national interests, while creating a mechanism for effective prevention (neutralization) of national security threats.

According to Art. 2 of the Ukraine's law "On National Security" the legal basis in the field of national security and defense is the Constitution of Ukraine, this and other laws of Ukraine, international treaties, the consent for necessity of which was adopted by Verkhovna Rada of Ukraine, and also which were issued to implement the Constitution and laws of Ukraine and other regulations[10].

That said, it should be noted that in accordance with Art. 9 of the Constitution of Ukraine[6] and Part 2 of Art. 19 of the Law of Ukraine "On International Treaties of Ukraine" it is provided that if the international treaty of Ukraine, which entered into force according to the standard procedure, establishes rules other than those provided for in the relevant legislative act of Ukraine, the rules of the international treaty apply[11].

Thus the above allows us to determine the following four levels of Ukraine's national security legal support, which can be ranked by legal force from the highest: Constitutional level, level of ratified international treaties, legislative level, and level of bylaws. Characterizing the constitutional level of Ukraine's national security legal support, it should be noted that Art. 16-18 of the Constitution of Ukraine are directly related to this issue.

According to above noted articles the following types of security are defined in Ukraine: environmental, economic, informational, and state security. Moreover, it is noted in Art. 17 that the protection of the sovereignty and territorial integrity of Ukraine, ensuring its economic and information security are the most important functions of the state, the business of the entire Ukrainian people. It should be noted that according to Art. 18 of the Constitution of Ukraine our state has established its obligation to comply with generally accepted norms and principles of international law, as well as to maintain peaceful and mutually beneficial cooperation with members of the international community.

That is why the next level of national security legal support will be international agreements ratified by the Verkhovna Rada of Ukraine. Undoubtedly, the main place in the system of such acts belongs to the UN Charter. Of course, the most important principle of international law for Ukraine is that which defined by paragraph 4 of Art. 2 All Members shall refrain in their international relations from the threat or use of force against the

territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations.[14].

Despite the fact that Russia, as the successor to the USSR, is a permanent member of the UN Security Council, it grossly violated this principle of international law by annexing Crimea and occupying certain areas of Donetsk and Luhansk regions. In addition to gross violations of international law, Russia virtually destroyed the entire system of international security, which was formed after World War II. At the same time, the whole world community understands that the norms of international law are no longer a guarantee of their territorial integrity and sovereignty safety.

Regarding the legislative level of legal support of national security, it is represented by a fairly large set of legislative acts, among which are the following: "On Defense of Ukraine", "On Defense, Mobilization Training and Mobilization", "On the Armed Forces of Ukraine", "On the National Security and Defense Council", "On Intelligence" and a number of other laws. The main act of law at the Ukraine's national security legislative level is the Law of Ukraine "On National Security of Ukraine". The above mentioned law was adopted in 2018 and is an amended version of the identical law, which was adopted in 2003. The valid law contains both positive and negative aspects of national security support.

First of all, it should be noted that both the new law and the previous one did not comply with the constitutional level of legal support of Ukraine's national security. First and foremost, this applies to the types of national security, none of the laws singled out environmental security, and the current law also lacks economic security. Such a situation leads to a very narrow understanding of national security as a phenomenon designed to ensure the defence of state sovereignty, territorial integrity, democratic constitutional order and other national interests of Ukraine from real and potential threats. At the same time, issues of economic, humanitarian and economic security remained outside the scope of legislative support.

Moreover, based on the definition provided in the law "On National Security", it can be concluded that national security consists of only two types: military security and state security, and the difference between them is that they have a common object of protection, but they carry it out taking into consideration different types of threats, respectively of a military nature, and not of a military nature. Such a primitive understanding of national security and the corresponding legal implementation can lead to a real lowering of the national values protection level and the entire national security system. This state requires clarification of certain provisions of the law "On National Security of Ukraine".

Regarding the bylaw level of legislative support of national security, it is the most numerous group of regulatory acts, their number is several thousands. Of course, it is not possible to analyze them in the scope of this article research. However, among the whole set of regulatory acts, the most important is the Decree of the President of Ukraine №392/20 "On the decision of the National Security and Defense Council of Ukraine of September 14, 2020 "On the National Security Strategy of Ukraine"[12]. This strategy has both positive aspects, such as the introduction of the concept of sustainability, which should significantly improve the state of national security, and negative aspects, in particular, the absence of indicators of goals achievement, which makes such a strategy too declarative.

At the present stage of public administration reforming under the conditions of democratic transition Ukraine is characterized by finding new management solutions in the process of social transformation and new forms of social problems solving. The transformation during the transition from authoritarian regimes to democracy takes place mainly in the political and legal spheres, where the monopoly system of public administration becomes pluralistic and covers all spheres of public life.

Democratic transition is a political transformation that has an institutional focus, it leads to institutional breakdown and the establishing of new, democratic institutions, without going beyond the boundaries of the country regulatory environment. Civil society institutions take a special place in the processes of democratic transit.

A crucial task for the Ukraine's national security current system of state management is the necessity for a fundamental revision of the interaction mechanisms with civil society, which is one of the pillars of national stability and, accordingly, national security. National stability of society is a reaction of a social system to certain external and internal destructive influences without significant loss of its functionality. Such a stability is resilience, flexibility, the ability to adapt to a new security environment, new challenges and to remain resistant to social crises, as well as to recover quickly after them. In the world scientific thought, national stability is one of the most common concepts in the field of national security, and civil society is considered as its core component *pleno jure*.

The real testing of the national stability of Ukrainians was the annexation of Crimea by the Russian Federation in 2014 and the armed conflict in eastern Ukraine. In 2014 it is civil society which became an active part of the national resistance, which gave rise to such forms as volunteer movements supporting Ukraine Armed Forces, Volunteer Battalions of Territorial Defense of Ukraine, and charity of Ukrainian business. Thus, since 2014 Ukraine has experience in using the potential of civil society in the processes of implementing national stability and supporting national security. Precisely because the rapid and effective self-mobilization of civil society in 2014 the country has not lost its state sovereignty over most of its territory. According to Estonian experts opinion, the International Center for Defense and Security (ICDS) is currently the ground and a laboratory of innovative ideas and practices that form the basis of a whole-of-society approach to security and defense, according to which representatives of all population groups take responsibility and contribute to national security at the same level and together with public authorities[7, p.1].

In 2021 Ukraine began the process of institutionalization of the phenomenon of national stability and its legislative enshrinement in the government strategic documents in the field of national security, in particular in the National Security Strategy of Ukraine, the Military Security Strategy. Thus, the National Security Strategy of Ukraine specifies that one of its main basic principles is sustainability: the ability of society and the state to adapt quickly to changes in the security environment and maintain sustainable functioning, in particular, by minimizing external and internal vulnerabilities [12]. Current reforms in the governance of Ukraine's security and defense sector create opportunities for more intensive cooperation and synergies between government entities and civil society in the field of national security and bringing national stability to a new institutional level.

One more level of participation of civil society actors in the processes of national security is information and analytical support of national security. A necessary prerequisite for this activity is the organization of mutually beneficial cooperation and interaction between the governing entities, public organizations and businesses on the basis of trust and respect. In Ukraine information and analytical support of national security is provided by civil society entities in two directions: informational: counteraction to fakes from the Russian propaganda and struggle against destructive informational influences on public consciousness of Ukrainian citizens; and analytical: intellectual support of state and administrative decisions taking.

Some examples of non-governmental entities concerning supporting information security are the Ukrainian Crisis Media Center, the Bureau for Combating Hybrid Warfare, the International Center for Combating Russian Propaganda, and the "Bastion" International Information Consortium, which includes:

"Informatsiyni spryvtv" (informational resistance, "IC"); Army Research, Conversion and Disarmament Center; InformNapalm International Volunteer Network; "Myrotvorets" (Peacemaker) Center. Already in 2016 "Bastion" signed a Memorandum of Cooperation with the National Security and Defense Council of Ukraine (NSDC), the purpose of which is to coordinate the actions of the consortium with the entities of Ukraine's security sector: data exchange as for the information aggression of the Russian Federation against Ukraine, holding bilateral consultations in order to counteract the negative information influence of the Russian Federation, as well as developing recommendations for government entities and media organizations to identify and counter the information operations of the Russian Federation; involvement of IIC "Bastion" experts in the development of conceptual documents, as well as tactics and strategies for defence the interests of Ukraine in the information space.

The StopFake project is a crowdsourcing project created in March 2014 by teachers, students and graduates of the School of Journalism in National University of Kyiv Mohyla Academy. The idea of its establishing arose after the occupation of Crimea and in response to an aggressive propaganda campaign in the Russian media.

The system of intellectual support of state administration in the field of national security by the non-governmental sector is represented by think tanks, opinion factories, that provide intellectual support to government entities in decision-making. An additional area of work of think tanks is the training of the management elite, the formation of a vision of future international policy, cooperation with government entities, the involvement of civil society leaders in political activities, political education of the public.

According to the results of the annual Global Go To Think Tank Index Report 2020, presented by the "Think Tanks and Civil Society" (TTCSP) Program of the Lauder Institute of the University of Pennsylvania, the world's leading think tanks have been identified. The program conducts research as for the role of think tanks in the development of civil society and political institutions around the world. According to the research Ukraine ranks 6th among 22 Eastern European countries as for the number of think tanks: Ukraine has 39. In the Top Think Tanks Worldwide ranking, which consists of 177 positions, the Ukrainian Razumkov Center (Institute for Economic and Policy Research) ranks 45th. It is the only domestic think tank, which is marked in four categories: Top Defense and National Security; Top Foreign Policy and International Affairs Think Tanks; Top International Development Policy Think Tanks; Top International Economics Policy Think Tanks. And among the think tanks of Central and Eastern Europe, the Razumkov Center took 1st place for the second time in a row [4].

In addition to the Razumkov Center seven other Ukrainian think tanks are listed in the overall ranking of the region among 109 organizations. These are: the International Center for Policy Studies (ICPS), Kyiv National University of Economics, the Ilko Kucheriv Democratic Initiatives Foundation, the Dnipro Center for Social Research, the Institute for Economic Research and Policy Consulting, the Institute for Analytics and Advocacy, and the Institute for Mass Media.

The participation of civil society in the processes of democratic transition can also be defined as support for personnel reform of public administration. High-quality human resources should provide socio-political and socio-economic reforms which are underway in modern Ukraine. The development of high-quality and diverse personnel potential of the state is a matter of national security of Ukraine and its international image. Ukrainian civil society in the period from 2014 to the present has been becoming the main human resource that helps the public administration system to perform functions to support national security. After 2014 volunteers, representatives of domestic business, and veterans of the Anti-Terrorist Operation were employed in government entities on civil service positions.

Many of the volunteers left their own successful businesses for the sake of the country and found employment in government entities and are professionally engaged in politics. They were elected deputies at the national and local levels, some of them became the military. Below there are some examples: Yuriy Biryukov: Ukrainian businessman, public figure, politician, founder of the group of volunteers "Phoenix Wings", which provided support to Ukrainian troops during the war in eastern Ukraine, adviser to President Petro Poroshenko (from August 2014 to May 2019), adviser to the Minister of Defense (October 2014 to 2019), member of the Central Council of the political party "European Solidarity"; Tetyana Rychkova: Assistant Minister of Defense and Chief of the General Staff (since 2015), People's Deputy of Ukraine (Verkhovna Rada of Ukraine of the VIII convocation) (since 2016); Adviser to the Deputy Minister of Defense and volunteer Natalia Voronkova; and others. At their public and political positions volunteers expose corruption and control the transparency of finances in security and defense sector entities, fight the bureaucracy of civil servants and their inaction, implement innovative projects, and so on. Nowadays the level of confidence in volunteers among the public is rather high. 66% of Ukrainian pollee citizens trust volunteer organizations [14].

Democratic civilian control over the security and defense sector is an important element of democratic transition processes. This is one of approaches that assumes, that a democratically elected political power and civil society are liable for making strategic decisions in the military sphere, not military command. The Law of Ukraine "On National Security of Ukraine" provides the following definition of this notion: "Democratic civilian control is a set of legal, organizational, informational, personnel and other activities carried out in accordance with the Constitution and legislation of Ukraine to ensure the rule of law, legality, accountability, transparency of security and defense entities, along with other entities, whose activities are connected with limitation of human rights and freedoms in cases defined by the legislation, supporting their effective activity and carrying out the functions assigned to them, strengthening Ukraine's national security".

Taking into consideration the fact that strategic decisions, such as the decision to start or end a war, have a great impact on the lives of all citizens, society's ability to control the military bloc is often seen as an integral part of a democratic country. The notion of democratic civilian control over the armed forces combines several processes at once:

- Civil society control over decision-making in military sphere
- Parliamentary control over defense policy
- Judicial control over compliance with the law in the military field
- Civil control by non-governmental organizations, independent media, trade unions.

There has formed a comprehensive system of democratic civilian control over the security and defense sector in Ukraine, the main elements of which are the following:

- control by the President of Ukraine, which is exercised over through the National Security and Defense Council of Ukraine, authorized officials and entities;

- parliamentary control exercised by the relevant committees, the Accounting Chamber and the Verkhovna Rada Commissioner for Human Rights;
- control by the Cabinet of Ministers of Ukraine, executive bodies and local self-government bodies;
- judicial control;
- public control.

In general, Ukraine has implemented all the basic provisions of the Parliamentary Assembly of the Council of Europe recommendations on democratic control over internal security services, in particular:

- the Verkhovna Rada of Ukraine has developed and adopted laws regulating the activities of intelligent services and law enforcement agencies, including as for operational and service activities, during which the rights of citizens may be temporarily limited;
- the Parliament of Ukraine approves the budget of the security and defense sector entities and monitors the status of its implementation through the Accounting Chamber of the Verkhovna Rada of Ukraine;
- executive bodies exercise consistent control over the activities of law enforcement agencies, which provide annual reports on their activities, as well as periodically prepare white papers;
- Judicial authorities carry out preliminary and subsequent control, by issuing permits for measures that temporarily limit human rights. All citizens can also apply to the court with petitions as for possible violations of their constitutional rights;
- Public associations and citizens have the right to access information collected by security sector entities. Exceptions to exercise this right may be only in case of achieving information with limited access, which specified by the legislation of Ukraine;
- The Verkhovna Rada Commissioner for Human Rights examines citizens' petitions regarding possible violations of their rights; tables submissions on the issues of observance of the rights and freedoms of citizens to the Prosecutor General, to heads of law enforcement agencies, military formations and intelligent services; provides appropriate proposals for adoption of legislative acts;
- According to the Law on Information, every citizen can apply to intelligent services or law enforcement agencies concerning a particular issue. Such requests must be compulsorily examined in accordance with the competence and requirements of the legislation.

4 Discussion

Taking into account above said and European principles of formation and development of the system of democratic civilian control over the security and defense sector, the following ways of developing and improving the efficiency of such a system in Ukraine can be specified:

- 1) improving the efficiency of democratic civil control entities, which includes development of government administration system of the security sector, providing for:
 - coordination of functions, powers, responsibilities and control over its parts;
 - getting feedback from independent (impartial) control over management parameters;
 - strengthening the coordination capabilities of the National Security and Defense Council of Ukraine along with ensuring the systematic approach and comprehensiveness of its management decisions concerning the security and defense sector;
- 2) ensuring the effectiveness of public authorities in developing the Armed Forces and other military formations, the military-defense complex with the priority definition of the conceptual foundations of political management of the defense sector, functions and tasks of all security and defense sector entities;
- 3) scientific substantiation of institutional transformations and administrative decisions on issues related to security and defense. Development and practical application of democratic civil control, scientifically based criteria and methods of step-by-step evaluation of the results of the functioning of all security sector structures, taking into account the specifics of their tasks, functions and powers;
- 4) improving the effectiveness of parliamentary control, in particular by:
 - inclusion in the practice of the Verkhovna Rada of Ukraine of issues related to consideration and approval of state

- programs for the establishing and development of security sector entities, which provides responsibility for the effectiveness of their implementation;
 - strengthening control over the entire defense budget and over its most important elements;
 - initiating an open public dialogue on strategic issues of defense and security policy, followed by the implementation of the prepared proposals;
- 5) optimization of the procedure of providing periodic reports and personal responsibility of senior government officials for the quality and implementation of decisions in the field of military reform, military-political and economic efficiency of defense spending;
 - 6) ensuring transparency of conceptual decision-making processes in the defense and security spheres, in particular on issues of the defense budget, personnel policy, social and legal protection, which will create conditions for independent expertise, awareness of citizens and society;
 - 7) refining of mechanisms of involvement in the practice of formation of the state defense policy and system of democratic civil control by scientific institutions, institutes of civil society, non-state think tanks and mass media.

5 Conclusion

1. The democratic transition process in Ukraine led up to a change in approaches of understanding the essence of national security and practice of its support. Today, in a scientific thought and at the legislative a value-oriented approach plays a significant role, based on the necessity to protect democratic values, which are the basis for the formation and implementation of national interests.
2. Ukraine has moved from a military organizing of a national security system to a sectoral approach of organizing. The structure and functions of the security and defense sector, which includes citizens and public organizations, have been determined. At the same time, the State Bureau of Investigation and the National Anti-Corruption Bureau of Ukraine are excluded from it. This is caused by the independence of these law enforcement agencies.
3. Democratic changes in the security and defense sector have not been completed and finally implemented in the process of implementing national security policy. Problems of economic and ideological nature, the unwillingness of society to systemic transformation, the polarization of political actors as for domestic and foreign policy priorities is often the obstacle to democratic transition in the field of national security. In addition, the remnants of a hybrid-type political system, characterized by corruption, nepotism, and cases of using authoritarian, informal practices in public administration, are preserved. At least the successful completion of democratic transition in the field of national security is impossible without democratization in the system of public relations.
4. It should be noted that at the constitutional level of national security legal support, changes are not urgent and its current state is sufficient to ensure national security. At the same time, as the experience and practice of some UN institutions show that it is urgent to amend the UN Charter to allow the UN General Assembly 2/3 of the composition to overcome the veto of any permanent member of the UN Security Council, or in the case when an international court will determine an act of aggression of any permanent member of the UN Security Council, in relation to any other country, while voting to respond to an act of aggression, the aggressor state should be deprived of the right to vote. This caused by the fact that the current situation allows almost with impunity, from the point of view of international law, permanent members of the UN Security Council to commit acts of aggression against other countries, and then veto any decisions on this issue in the UN Security Council.
5. The legislative level of national security legal support also needs to be improved, first of all, with regard to the need to harmonize the norms of laws with the requirements of the Constitution of Ukraine, provide more precise wording of

basic concepts, and more clearly structure such legislation. In general, each lower level of legal support should accord to and be consistent with the higher level.

6. The bylaw level of national security legal support should be streamlined. The National Security Strategy, as well as other Strategies adopted on its basis, should contain specific goals, quantitative and qualitative indicators, as well as the period during which these goals should be achieved.
7. Active and strong civil society can and should participate in the processes of protection of national values and realization of national interests, so it is an important factor in ensuring the security of democratic countries. This statement becomes especially relevant in the context of new hybrid threats Ukraine is facing.

Literature:

1. Dz`oban` O.P. Naczi`onal`na bezpeka v umovakh soczi`al`nikh transformaczi`j (metodologi`ya dosli`dzhennya ta zabezpechennya): Monografi`ya. [Dz`oban O.P. National security in the conditions of social transformations (research and provision methodology): Monograph]. Kharkiv: Konstanta, 2006. 440 p. ISBN 966-342-079-0.
2. Dz`oban` O.P., Zhdanenko S.B. Prava lyudini i` naczi`onal`na bezpeka: fi`losofs`ko-pravovi` aspekti vzyemozv'yazku. *Informaczi`ya i` pravo*. [Dz`oban O.P., Zhdanenko S.B. Human rights and national security: philosophical and legal aspects of the relationship. *Information and law*. 2020. № 2. P. 9-22. DOI: [https://doi.org/10.37750/2616-6798.2020.2\(33\)](https://doi.org/10.37750/2616-6798.2020.2(33))]
3. Gaponenko V.A. Perspektivi evolyuczi`yi gi`bridnoyi i`nstituczi`jnoyi sistemi suchasnoyi Ukraini. *Naukovi` praczi` MAUP. Seri`ya Poli`tichni` nauki*. [Gaponenko V.A. Prospects for the evolution of the hybrid institutional system of modern Ukraine. *Scientific works of IAPM. Political Science Series*, 2019, vol. 58 (2), p. 27–32. ISSN 2523-4625.
4. James G. McGann. 2020 Global Go To Think Tank Index Report. University of Pennsylvania. Available from: <https://razumkov.org.ua/uploads/2020%20Global%20Go%20To%20Index.pdf>
5. Kaufman V. Sushhnost` politiki sderzhivaniya. *Voennaya politika SShA i naczi`onal`naya bezopasnost`* [Kaufman V. The essence of containment policy // US military policy and national security]. M. 1958. P. 25-53
6. Konstytutsiia Ukrainy [Constitution of Ukraine]. Official journal. 2010 p., / № 72/1. Available from: <https://zakon.rada.gov.ua/laws/show/254%D0%BA/96-%D0%B2%D1%80#Text>
7. Teperik D., Ermalavichus T., Senkiv G., et al.: A Route to National Resilience. Building Whole-of-Society Security in Ukraine. ICDS. Estonia. 2019. April p.40. ISSN 2228-0529.
8. Zagumenna Y.O. Konceptuali`zaczi`ya fenomenu naczi`onal`noyi bezpeki v teoretiko-pravovi`j nauczi`: osoblivosti` suchasnoyi metodologi`yi. *Forum Prava*. [Zagumenna Y.O. Conceptualization of the phenomenon of national security in theoretical and legal science: features of modern methodology. *Forum Prava*, 2021. № 66 (1), p. 37–55]. ISSN 1995-6134.
9. Zakon Ukrainy "Pro osnovi naczi`onal`noyi bezpeki Ukrainy". [Law of Ukraine "On Fundamentals of National Security of Ukraine"]: Available from: <https://zakon.rada.gov.ua/laws/show/964-15#Text>
10. Zakon Ukrainy «Pro natsionalnu bezpeku Ukrainy» [Law of Ukraine "About National Security of Ukraine"]. Official journal. 2018 p., № 55. Available from: <https://zakon.rada.gov.ua/laws/show/2469-19#Text>
11. Zakon Ukrainy «Pro mizhnarodni dohovory Ukrainy» [Law of Ukraine "About International Agreements of Ukraine"]. Official journal. 2004 p., № 35. Available from: <https://zakon.rada.gov.ua/laws/show/1906-15#Text>
12. Ukaz Prezidenta Ukrainy «Pro rishennya Radi naczi`onalnoyi bezpeki i oboroni Ukrainy vid 14 veresnya 2020 roku «Pro Strategiyu naczi`onalnoyi bezpeki Ukrainy». [Decree of the President of Ukraine "About the National Security Strategy of Ukraine" №392 / 2020 of September 14, 2020. Available from: <https://www.president.gov.ua/documents/3922020-35037>

13. Ukraine 2020. Results of the year in the mirror of public opinion (December 2020). Available from: <https://razumko.v.org.ua/napriamky/sotsiologichni-doslidzhennia/ukraina2020-nevypravdani-ochikuvannia-neochikuvani-vyklyky-pidsumky-roku-u-dzerkali-gromadskoi-dumky-gruden-2020r>

14. United Nations Charter. Available from: <https://www.un.org/en/about-us/un-charter/chapter-1>

Primary Paper Section: A

Secondary Paper Section: AD, AG

COMPARISON OF PHYSICAL ABILITY AND PHYSICAL PERFORMANCE OF CHILDREN IN PRIMARY EDUCATION

^aMARIÁN MERICA, ^bRÓBERT OSAĐAN, ^cVIKTÓRIA KOVÁČOVÁ

*Comenius University in Bratislava, Faculty of Education
Račianska 59, 813 34 Bratislava, Slovak Republic
e-mail: ^america@fedu.uniba.sk ^bosadan@fedu.uniba.sk
^cwiki.kovacova94@gmail.com*

Abstract: The authors in their article approach the issue of physical ability and physical performance of children in primary education on the basis of diagnosing their motor skills. Testing was performed using a comprehensive Eurofit test battery consisting of nine tests. The aim of the article is to evaluate and compare the motor skills of children of younger school age in the village and in the city. The monitoring took place at two primary schools, in the town and in the village. The sample consisted of 104 students. They were boys and girls of the fourth and second year at the 1st stage of primary school. Based on the use of nine motor tests, using statistical indicators of the Student's t-test, we demonstrated statistically higher performance of children from the city, compared to children from the village. At the same time, tests of motor skills showed us higher performance of children in the fourth grade compared to children in the second grade - as well as in testing boys and girls. We also measured higher physical performance in boys overall than in girls. The article also brings a comparison of motor skills of the examined group with files by other authors. The article also provides an evaluation of the Body Mass Index (BMI) of children in our group in primary education, as well as an evaluation and comparison of body height and body weight of the examined group, as well as a comparison with measured somatometric indicators of other authors.

Keywords: physical performance, younger school age, diagnostics, motor skills, village and city.

1 Introduction

Without adequate physical activity, we cannot imagine life in our schools. Adequate physical activity is an important part of every individual's life, from kindergartens to colleges. According to Jakabčič (2002), during physical development, a child's physical performance increases significantly during the period of a young schoolboy, children are constantly on the move, but they are not yet able to manage their energy well, they can be exhausted quickly. The movement is coordinated and becomes graceful. Physical fitness, dexterity, mastery of various skills is also great psychological importance - it provides the child with a certain position in the group of peers. Oravcová (2009) states that in motor development the child's movements are graceful, well coordinated, physical movement is very important for a child of this period, he is looking for it. Good movement coordination allows him to give good sports performances, he is also skillful in other physical activities (dance, movement games). Physical and movement ability are a ticket to success in the children's group in this period. Dexterity, skills, physical performance are appreciated by other children. Physically weaker boys are more often lonely and compensate their gaps by success in school or other hobby activities.

Several authors, for example Belešová (2017, 2018), Čavojský (2015), Severini (2018) emphasize that teachers significantly influence the development of education system, education and upbringing. The importance of the teaching profession extends to all areas of society. The teacher influences the nature and quality of the relationship with students, conditions the atmosphere in the classroom, stimulates students' interest - including their relationship to sports and active physical activity, their experience at school, the development of their knowledge and their whole personality. This topic, as developed, opens up further opportunities for qualitative research, e.g. Kostrub (2016), Severini and Kostrub (2018). We are sure that the effort of teachers of physical and sports education is a constant effort to provide space for each student to be able to exercise physically and to feel the success of their activities, which will accompany him throughout his life.

The exclusion or restriction of physical activity usually has a negative effect on human activity: physical fitness is reduced, various diseases develop and aging processes are accelerated. On the contrary - active physical activity helps by activating the cerebral cortex, creating improved conditions for the

development of thinking, creation, interactions and experience. This is one of the reasons why suitably focused physical activity is very often recommended against the undesirable consequences of strained mental activity, such as: sport recreational activities, physical work, hobbies related with moves and other activities. Several researches by physical education doctors and pedagogical experts confirm that physically fit individuals are able to suppress fatigue from the monotony of life, because good condition allows them to retain much more energy, and therefore interest in their work. We encounter the recommendation of physical activities as a part of a healthy lifestyle in the works of several authors, e.g. Adamčák (2010), Antala et al. (2014), Argaj (2016), Bence (2011), Belešová (2012), Belešová-Talapková (2020), Gregor (2007, 2013), Horváth et al. (2010, 2016), Hřčka et al. (2011), Kampmillerová (2015), Kompán et al. (2009), Merica (2018), Miňová (2014), Šimonek (2012), Šimonek et al. (2014) and others. Among other things, these authors emphasize the need for regular exercise from the earliest school age.

2 Methodology

The Goal. The goal of the article is to evaluate and compare the motor skills of children in primary education in the village and in the city through a comprehensive battery of Eurofit tests, consisting of nine (9) tests. At the same time, compare our obtained results with the results of other authors. The research sample consisted of 104 pupils in the second and fourth year of primary schools. The article is also focused on finding out the physical condition of children in selected primary schools.

The Task. Based on our goal, we set the following tasks: to select schools bases in the village and in the city to solve our problem, to select a battery of tests to determine and compare motor skills in children in the 1st grade of primary school, to carry out planned testing. Statistically process and evaluate the measured results.

Hypotheses. Based on the goal and tasks of the work, we have built 5 hypotheses, which we present in the results of the work.

Methodology. Our research involved 104 children from primary schools in the town of Sládkovičovo (53 children), of which 30 were boys and 23 girls, and from the village of Veľké Úľany (51 children), of which 28 were boys and 23 girls. They were children of the second and fourth years from the 1st grade of primary school.

Data acquisition methods: To find out the data on children's motor abilities, we chose a battery of Eurofit tests according to (Moravec et al. 2002), which consists of the following nine (9) tests: "Flamingo" balance test (T1), Plate tapping (T2), Forward bending in sitting (T3), Long jump from a place (T4), Manual dynamometry (T5), Lie down - sit up in 30 s (T6), Stay in pull-up (T7), Shuttle run 10 x 5 m (T8), Endurance shuttle run (T9). We used basic somatometric measurements to determine the data on body weight and body height of the monitored children.

Methods of processing and evaluation of results: We statistically processed and evaluated the achieved measured data on the basis of a statistical method: Student's t-test (parametric paired t-test), which compares differences in two groups. Statistical significance was determined based on $p < 0.01$, $p < 0.05$, $p < 0.1$ significance level. The use of several statistical methods can also be found in the authors Gunčaga, Zawadowski and Prodromou (2019). Statistical tests can also be performed in relation to different study results of siblings within one family (see Gorajnska, Stando and Gunčaga, 2018). Comparison of statistical quantities can be performed in quantitative research using Student's t-test, which is generally divided into two variants: one-sided or two-sided t-test (Kitchenham, et al., 2016; Gauthier & Hawley, 2015). The T-test can be applied in a statistical analysis provided that the data satisfy the normal probability distribution. Otherwise, it is possible to compare bilaterally

using the Mann-Whitney test (Kitchenham, et al., 2016). Wilcoxon's exact test with many applications is very often used in pairwise comparisons - both in the technical and educational field, e.g. (Barot, et al., 2020; Cieslar, et al., 2020).

3 Results and discussion

The results obtained from the testing of motor skills of children in primary education are presented in tables with an opinion on the individual five hypotheses. From hypothesis testing using Student's t-test, we confirm or do not confirm the existence of statistically significant dependences based on $p < 0.01$, $p < 0.05$, $p < 0.1$ level of statistical significance.

At the same time, we compare our obtained results with the results from other authors: Moravec et al. (2002) and Perič et al. (2010). The resulting part also contains the evaluation of body weight and body height of children with the present calculation of the Body Mass Index (BMI) and its subsequent comparison with values from other authors.

3.1 Evaluation of hypotheses

Statistical method: Student's t-test (parametric paired t-test) was performed for the following established hypotheses (H1, H2, H3, H4, H5):

H 1: Tests of motor skills show higher performance in children from the village than in children from the city.

H 2: Tests of motor skills show higher performance in boys than in girls.

H 3: Tests of motor skills show higher performance in fourth-year children than in second-year children.

H 4: Tests of motor skills show higher performance in boys in the fourth year than in boys in the second year.

H 5: Tests of motor skills show higher performance in fourth-year girls than in second-year girls.

Next, we proceed to the presentation of results based on the Student's t-test with simultaneous opinions on the following five hypotheses. (H1, H2, H3, H4, H5).

H 1: "Tests of motor skills show higher performance in children from the village than in children from the city" (Table 1, Table 2, Table 3). In the first hypothesis, we assumed that the children from the village would be more successful in the tests than the children from the city because even today it is still possible to feel the agricultural and economic lifestyle in the village, that the village children move more in the yard, as most of them lives in houses. We assumed that they devote more time to work in the garden and around the yard, so they are more physically active and at the same time more capable. Our first hypothesis (H1) was not confirmed (was rejected), as children from the village showed higher performance in only four motor tests and children

from the city showed higher performance in the following five motor tests: balance test, plate tapping, manual dynamometry, lie down-sit up for 30s and test: stay in pull-up. From the achieved results, we state that the children from the city did better in the tests, which were focused on static balance, frequency speed and strength of the dominant hand, strength of the upper limbs, lumbar-thigh and abdominal muscles. The children from the village did better in these four tests: forward bending in sitting, long jump from a place, shuttle run 10 x 5 m and endurance shuttle running - which means that they achieved better results in tests focused on torso mobility, explosive force lower limbs, running speed and endurance. Based on the above, we can conclude that tests of motor skills have shown higher performance in children in the city than in children in the village. We achieved statistically significant results in two tests, namely in the test: plate tapping at $p < 0.05$ and test: endurance shuttle run already at $p < 0.01$.

In tab. (1) we present the results achieved in nine tests of physical performance (T1 - T9) in children from the city. In tab. (2) we present the results of tests of children from the village. In tab. (3) we see the evaluation of hypothesis (H1) by Student's t-test. In the first test: the "flamingo" balance test (T1) were better students from the city. When evaluating the t-test, we found that this was not a statistically significant result. In the second test: plate tapping (T2) children from the city finished better than from the village. However, in this test a statistically significant result already occurs at $p < 0.05$ and $p < 0.1$. In the third test: forward bending in sitting (T3), children from the village achieved better results, although the result measured by us is not statistically significant. In the fourth test: the long jump from a place (T4), again children from the village were better, but the values do not represent statistical significance. In the fifth test focused on manual dynamometry (T5), we measured more favorable values for students from the city. However, we cannot talk about statistical significance in this test. In the sixth test: lie down-sit up (T6) again finished better children from the city than from the village. The measured values are not statistically significant. In the seventh test: endurance in pull-up (T7), we obtained better values from children from the city than from the village, although these are not statistically significant results. In the penultimate eighth test: shuttle running (T8), we measured better time for children from the village than tested children from the city, but even these values are not statistically significant. In the last ninth test: the endurance shuttle run (T9), were children from the village better than from the city. Here, however, we speak of statistically significant results at $p < 0.01$, $p < 0.05$ and $p < 0.1$. We state that our Hypothesis (H1) was not confirmed (was rejected), as in five motor tests children from the city were more successful and only in four children from the village.

Table 1 Evaluation of achieved results in children's tests - the city (H1)

The city	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	1,62	8	1	1	74,83	1,41	0	8	1,86	1,88
T2	13,1	9,6	13,1	11,1	84,83	1,60	9,2	18,8	1,97	1,99
T3	0,85	38	1	0	362,15	6,83	-19	19	8,34	8,42
T4	125,85	96	124	{131, 133, 120, 104, 130}	903,84	17,05	87	183	22,00	22,21
T5	20,34	20	20	{16, 20}	215,05	4,05	13	33	5,05	5,09
T6	22,13	30	22	{20, 22}	214,71	4,05	10	40	5,43	5,48
T7	9,71	60	0	0	565,89	10,67	0	60	13,87	14
T8	25,10	14	25	{26.6, 24.4}	123,70	2,33	15,4	29,4	2,91	2,93
T9	54,77	133,9	53,3	{72.5, 28.3}	964,33	18,19	14,1	148,0	25,51	25,75

Table 2 Evaluation of achieved results in children's tests - the village (H1)

The village	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	1,82	8	1	0	84,47	1,65	0	10	2,17	2,19
T2	17,7	16,90	13,7	13,7	148,28	2,9	10,2	27,1	3,92	3,96
T3	1,82	25	3	8, -8	274,58	5,38	-10	15	6,44	6,50
T4	126,33	102	120	120	806,66	15,81	88	190	19,83	20,03

T5	18,80	24	18	16	230,62	4,52	11	35	5,45	5,50
T6	20,48	22	20	18	209,76	4,19	11	33	5,38	5,44
T7	8,53	33,80	6,25	9	290,44	5,8	0	33,8	7,74	7,82
T8	23,51	17,2	23,8	23,8	123,54	2,42	12,9	30,1	3,34	3,38
T9	100,50	295,2	84,5	60	1964,6	38,52	44,8	340,0	59,25	59,84

Table 3 Evaluation of hypothesis (H1) by t-test

Test	σ^2	S_x^2	σ	s	H.t.	H.p.	p<0,01	p<0,05	p<0,1	Evaluation
T1	3,48	4,18	2,02	2,04	-0,501	617299	-	-	-	City
T2	10,16	9,73	3,18	3,11	-2,579	0,010115	-	S.	S.	City
T3	56,08	56,94	7,48	7,52	-0,658	0,511798	-	-	-	Village
T4	439,80	448,37	20,97	21,17	-0,111	0,90741	-	-	-	Village
T5	28,16	28,12	5,30	5,3	1,476	0,142894	-	-	-	City
T6	29,96	29,87	5,46	5,5	1,533	0,128318	-	-	-	City
T7	128,45	130,65	11,33	11,38	0,520	0,603667	-	-	-	City
T8	10,37	10,01	3,22	3,16	2,407	0,010176	-	-	-	Village
T9	2576,1	2093,7	50,75	45,75	-5,095	0,00001	S.	S.	S.	Village

H:2 „Tests of motor skills show higher performance in boys than in girls” - tab. (4), tab. (5), tab. (6).

In compiling other hypotheses, we took into account the developmental and physiological aspects of individual age categories and gender of students. The above hypothesis (H2) was confirmed to us, because the boys were more capable in the following as many as seven tests: plate tapping, long jump from the place, manual dynamometry, lie down-sit up, stay in pull-up, shuttle running and endurance shuttle running. The girls passed the balance test and the forward bending in sitting, it means two tests. Statistically significant results were demonstrated in the following four tests: long jump from a place, already at p <0.01, manual dynamometry at p <0.05, endurance in pull-up, also at p <0.01 and shuttle running at p <0.1.

In tab. (4) we present the results achieved in nine tests of physical performance (T1 - T9), which were achieved by boys. In tab. (5) we present the results of tests of children from the village. In tab. (6) we see the evaluation of hypothesis (H2) by Student's t-test. Next, we comment on the achieved results of individual tests. In the first test: the "flamingo" balance test (T1), the girls were more successful, although this was not a statistically significant result. In the test: plate tapping (T2) were

more successful boys, although the result was not statistically significant. In the third motor test: forward bending in sitting (T3), the girls were more successful - the result was not statistically significant. In the fourth motor test: long jump from the place (T4), with a statistically significant result at p <0.01, p <0.5, p <0.1, the boys were better placed. In the test: manual dynamometry (T5) the boys were more successful at the values of significance: p <0.05, p <0.1 where we talked about statistically significant results. In the motor test: boys sat more easily in 30 s (T6), although the results measured by us are not statistically significant. In the test of endurance in pull-up (T7) the boys were more capable and their achieved results are statistically significant at the values of significance: p <0.01, p <0.05, p <0.1. In the penultimate motor test: a 10 x 5 m (T8) shuttle run, the boys achieved better results. This result is statistically significant at p <0.1. The last test: the endurance shuttle run (T9) was better performed by the boys, even it is not a statistically significant result. Based on the results obtained in motor tests, we state that the hypothesis (H2) was confirmed, given that boys showed higher performance in even seven (7) tests, while girls only in two (2) tests. Statistically significant results were obtained in the following four tests: long jump from a place (T4), manual dynamometry (T5), endurance in pull-up (T7) and a 10 x 5 m shuttle run (T8).

Table 4 Evaluation of achieved results - boys (H2)

B	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	1,84	10	1	0	100,51	1,73	0	10	2,30	2,32
T2	13,78	17,9	13,2	11,1	130,16	2,28	9,2	27,1	3,25	3,28
T3	1,00	34	2	{4, 8}	342,00	5,89	-19	15	7,21	7,28
T4	132,45	103	131	120	1036,89	17,87	87	190	21,96	22,16
T5	20,60	24	20	23	274,20	4,72	11	35	5,76	5,81
T6	21,53	24	20,5	20	252,06	4,34	11	35	5,58	5,62
T7	12,26	60	8,1	0	597,65	10,48	0	60	13,44	13,56
T8	23,72	17,2	23,9	{24,1, 23,8, 22,9}	131,60	2,26	12,9	30,1	3,10	3,13
T9	81,68	333	66,5	72,5	2241,87	37,99	7,0	340,0	56,34	56,82

Table 5 Evaluation of achieved results - girls (H2)

G	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	1,57	6,0	1	0	61,4	1,33	0	6,0	1,59	1,61
T2	14,14	16,8	13,7	13,6	94,7	2,05	10,2	27,0	3,07	3,10
T3	1,75	30,0	2,5	{-8, 6, 0}	299,5	6,51	-11	19,0	7,81	7,90
T4	118,07	76,0	119	130	614,9	13,36	88	164,0	16,44	16,62
T5	18,30	17,0	18	16	165,8	3,6	11	28,0	4,33	4,38
T6	20,98	30	20	18	182,9	3,97	10	40,0	5,29	5,35
T7	5,66	24,9	3,6	0	231,7	5,03	0	24,9	6,27	6,34
T8	24,97	15,8	25,05	{25, 24,4, 26,4, 28,9, 26,6}	115,53	2,51	13,7	29,5	3,23	3,26
T9	69,79	283,6	63,65	{72,5, 73,2, 59,6, 40,4}	1139,38	24,76	14,1	297,7	42,25	42,71

Table 6 Evaluation of hypothesis (H2) by t-test

Test	σ^2	S_x^2	σ	s	H.t.	H.p.	p<0,01	p<0,05	p<0,1	Evaluation
T1	4,10	4,17	2,02	2,04	0,693	489337	-	-	-	Girls
T2	10,13	10,3	3,18	3,20	-0,571	568755	-	-	-	Boys
T3	56,22	57,19	7,49	7,56	-0,502	616527	-	-	-	Girls
T4	439,80	396,40	20,97	19,90	3,658	0,0403	S.	S.	S.	Boys

T5	28,16	27,39	5,30	5,23	2,225	0,28276	-	S.	S.	Boys
T6	29,85	30,37	5,46	5,51	0,511	610288	-	-	-	Boys
T7	128,38	119,95	11,33	10,95	3,039	0,03014	S.	S.	S.	Boys
T8	10,37	10,19	3,22	3,19	-1,969	0,51662	-	-	S.	Boys
T9	2600,51	2615,53	50,99	51,14	1,182	239897	-	-	-	Boys

H 3: „Tests of motor skills show higher performance in fourth-year children than in second-year children“ - tab. (7), tab. (8), tab. (9).

We tested this hypothesis regardless of whether children are from the city or the village, and also regardless of gender differences. Hypothesis (3H) was confirmed. 4th year students were more successful in five (5) motor tests: balance test, plate tapping, long jump from a place, manual dynamometry and lie down-sit up. 2nd year students were more successful in four (4) tests: forward bending in sitting (T3), endurance in pull-up (T7), shuttle running (T8) and endurance shuttle running (T9). We achieved statistically significant results in tests: balance test (T1) at $p < 0.1$, plate tapping (T2), already at $p < 0.01$, long jump from place (T4) at $p < 0.05$, manual dynamometry (T5) and shuttle run test (T8). In both tests, the results were significant even at the level of statistical significance $p < 0.01$.

In tab. (7) we present the achieved results in nine tests of physical performance (T1 - T9) achieved by 4th year students. In tab. (8) we offer the results of tests of motor skills of 2nd year students. In tab. (9) we can see the evaluation of hypothesis (H3) by Student's t-test. Next, we comment on the achieved results of individual tests. 4th grade students passed the "flamingo" balance test (T1) more successfully. The results obtained are

significant at a significance level of $p < 0.1$. In the test: plate tapping (T2) were faster 4th grade students. The measured results are statistically significant at the significance level $p < 0.01$, $p < 0.05$ and $p < 0.1$. In the test: forward bending in sitting (T3) were 2nd year students more successful, although the results were not statistically significant. In the fourth test: the long jump from the place (T4), 4th were placed better and the results measured by us are significant at $p < 0.05$ and $p < 0.1$. In the test: hand dynamometers (T5) we see better values in 4th. These results are significant at $p < 0.01$, $p < 0.05$ and at $p < 0.1$. In the test: lie down-sit up in 30s (T6), 4th year students were more successful, although the results obtained are not statistically significant. It is interesting that in the last three tests the 2nd year students were more successful. These were statistically significant results only in the eighth test: shuttle running (T8). The results measured by us are significant at $p < 0.01$, $p < 0.05$, $p < 0.1$. Based on the achieved results, we confirm that the children of the 4th year showed higher performance in the tests of motor skills, specifically in five tests, while the children of the 2nd year passed only 4 tests better. We can state that hypothesis (H3) has been confirmed. Statistically significant results were achieved by children in the following tests: balance test (T1), plate tapping (T2), long jump from a place (T4), manual dynamometry (T5) and shuttle running (T8).

Table 7 Evaluation of achieved results - children of 4th year (H3)

4th	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	1,43	8	1	0	85,22	1,27	0	8	1,64	1,65
T2	12,87	7,9	12,88	11,1	98,57	1,49	9,2	17,1	1,79	1,80
T3	0,43	38	0	0	390,29	5,82	-19	19	7,28	7,34
T4	129,60	100	128	120	1072,59	16,00	90	190	20,75	20,90
T5	21,48	22	21	18	273,34	4,07	13	35	5,05	5,09
T6	21,64	19	21	20	235,64	3,51	12	31	4,36	4,39
T7	9,12	60	5,45	0	577,6	8,75	0	60	12,51	12,60
T8	24,89	14,2	25	{25, 26,6}	159,42	2,37	15,4	29,6	2,96	2,98
T9	75,22	325,9	63,4	{72.5, 28.3, 60}	2315,28	34,55	14,1	340	58,35	58,79

Table 8 Evaluation of achieved results - children of 2nd year (H3)

2nd	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	2,24	10	1	0	73,67	1,99	0	10	2,49	2,53
T2	15,68	17	14,1	13,8	124,32	3,36	10,5	27,1	4,21	4,26
T3	2,95	29	5	{10, 4, 8}	230,59	6,23	-14	15	7,57	7,68
T4	119,73	78	120	120	574,81	15,53	87	165	19,84	20,11
T5	16,16	14	15	{13, 14, 15, 16}	112,10	3,02	11	25	3,83	3,89
T6	20,75	30	18,5	18	192,50	5,34	10	40	7,05	7,15
T7	9,16	29,3	5,9	0	281,38	7,60	0	29,3	8,85	8,97
T8	23,15	17,2	23,8	23,8	86,85	2,34	12,9	30,1	3,35	3,40
T9	80,77	111,3	72	{60, 136.5, 72.5}	997,50	26,95	41,8	153,1	32,48	32,93

Table 9 Evaluation of hypothesis (H3) by t-test

Test	σ^2	S_x^2	σ	s	H.t.	H.p.	$p < 0,01$	$p < 0,05$	$p < 0,1$	Evaluation
T1	4,10	4,03	2,02	2,00	-1,970	0,51496	-	-	S.	4th
T2	10,13	8,6	3,18	2,93	-4,076	0,00018	S.	S.	S.	4th
T3	56,08	55,7	7,48	7,46	-1,643	10328	-	-	-	2nd
T4	439,80	425,56	20,97	20,62	2,334	0,21505	-	S.	S.	4th
T5	28,16	22,12	5,30	4,10	5,518	0,0001	S.	S.	S.	4th
T6	29,96	30,38	5,47	5,51	0,782	435466	-	-	-	4th
T7	128,45	131	11,33	11,44	-0,017	985733	-	-	-	2nd
T8	10,37	9,87	3,22	3,14	2,712	0,07833	S.	S.	S.	2nd
T9	2576,10	2619,40	50,75	51,18	-0,529	59732	-	-	-	2nd

H 4: „Tests of motor skills show higher performance in boys in the fourth year than in boys in the second year“ - tab. (10), tab. (11), tab. (12).

Hypothesis (4 H) was confirmed, because even in seven (7) motor tests were older boys of the 4th year more successful. Only in two tests: forward bending in sitting (T3) and in the test: shuttle run (T8) the boys of the 2nd year gave better results. It is interesting that we recorded statistically significant results in the

first five tests, namely - in the balance test (T1) at $p < 0.05$, in the plate tapping test (T2) already at $p < 0.01$, in the test the forward bending in sitting (T3) at $p < 0.05$, in the test long jump from a place (T4) at $p < 0.1$ and in the test manual dynamometry (T5) in which the results were significant already at $p < 0.01$.

In tab. (10) we present the achieved results in nine tests of physical performance (T1 - T9) achieved by boys of the 4th year. In tab. (11) we offer the results of tests of motor skills of 2nd year boys. In tab. (12) we see the evaluation of hypothesis (H4) by Student's t-test. Next, we comment on the achieved results of individual tests.

The first motor test: the "flamingo" balance test (T1) was better performed by 4th graders. The measured results are statistically significant at $p < 0.05$ and $p < 0.1$. The second test (T2) was also passed more successfully by boys of the 4th year and the values measured by us are significant at $p < 0.01$, $p < 0.05$ and $p < 0.1$. In the third motor test (T3) the boys of the 2nd year were better.

Table 10 Evaluation of achieved results - boys of 4th year (H4)

4th	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	1,32	8	1	0	41,52	1,22	0	8	1,72	1,75
T2	12,82	7,9	12,7	{17.1, 10.2, 11.1, 14.1, 13.4}	53,52	1,62	9,2	17,1	1,94	1,97
T3	-0,71	31	-0,5	2	172	5,05	-19	12	6,41	6,51
T4	137,12	100	135,5	120	620,23	18,24	90	190	22,45	22,79
T5	23,15	20	22	22	148,17	4,35	15	35	5,37	5,45
T6	21,88	19	22	20	134,47	3,95	12	31	4,96	5,04
T7	12,54	60	5,9	0	407,13	12,33	0	60	15,76	16,01
T8	24,14	14,2	24	{25, 27.4, 22.9, 23.2, 23.9}	74,57	2,19	15,4	29,6	2,85	2,90
T9	84,27	319	72	72,5	1476,04	43,41	21	340	66,78	67,78

Table 11 Evaluation of achieved results – boys of 2nd year (H4)

2nd	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	2,58	10	1	1	55,5	2,31	0,0	10	2,76	2,82
T2	15,10	16,6	13,75	{13.1, 11.8, 13.8, 11.1}	78,65	3,27	10,5	27,1	4,12	4,21
T3	3,42	29,0	4,5	4	144,66	6,02	-14	15	7,59	7,75
T4	125,83	78	120	120	377,33	12,72	87	165	19,42	19,84
T5	17,00	14	16	13	84	3,5	11	25	4,16	4,25
T6	21,04	24	20	18	113,25	4,71	11	35	6,31	6,45
T7	11,88	29,3	11,9	0	193,6	8,06	0	29,3	9,34	9,54
T8	23,14	17,2	23,8	{23.8, 24.4, 24.1}	57,42	2,39	12,9	30,1	3,33	3,40
T9	78,16	146,1	66	{60, 136.5}	771,04	30,84	7	153,1	37,46	38,23

Table 12 Evaluation of hypothesis (H4) by t-test

Test	σ^2	S_x^2	σ	d	H.t.	H.p.	p<0,01	p<0,05	p<0,1	Evaluation
T1	5,30	5,09	2,30	2,25	-2,093	0,40835	-	S.	S.	4th year
T2	10,61	9,69	3,25	3,11	-2,723	0,08643	S.	S.	S.	4th year
T3	52,10	49,69	7,21	7,04	-2,193	0,32437	-	S.	S.	2nd year
T4	482,66	467,91	21,96	21,63	1,956	0,55375	-	-	S.	4th year
T5	33,27	24,97	4,99	5,76	4,614	0,00023	S.	S.	S.	4th year
T6	31,14	32,08	5,58	5,66	0,556	579928	-	-	-	4th year
T7	180,79	187,26	13,44	13,68	0,180	857048	-	-	-	4th year
T8	9,63	9,73	3,10	3,11	1,203	233917	-	-	-	2nd year
T9	3174,20	3276,17	56,34	57,23	0,404	687174	-	-	-	4th year

H 5: „Tests of motor skills show higher performance in fourth-year girls than in second-year girls“ - tab. (13), tab. (14), tab. (15).

Based on the results obtained, we state that hypothesis (H5) was confirmed, as the 4th passed six (6) motor tests better, while the younger girls only passed the following three (3) tests: forward bending in sitting (T1), shuttle running (8) and endurance shuttle run (T9). We obtained statistically significant results in the tests: plate tapping (T2), already at $p < 0.01$, long jump from a place (T4) at $p < 0.05$, manual dynamometry (T5) at $p < 0.01$, shuttle run (T8) at $p < 0.05$.

These results are statistically significant for $p < 0.05$ and $p < 0.1$. In the test: the long jump from a place (T4) were more successful boys of the 4th year. This result is statistically significant at $p < 0.1$. In the fifth (T5), sixth (T6) and seventh tests (T7), fourth-year students were again more successful. A statistically significant result was also recorded in the test: manual dynamometry at $p < 0.01$, $p < 0.05$, $p < 0.1$. Penultimate test: shuttle run (T8), younger students of the 2nd grade ran more successfully. However, the results were not statistically significant. The last test (T9) was passed by older students of the 4th grade. However, this result is not statistically significant. Hypothesis (H4) determined by us was confirmed. Even in seven (7) tests did the children of the 4th year show higher performance, while the younger children showed in only two tests. We recorded statistically significant results in the following tests: balance test "flamingo" (T1), plate tapping (T2), forward bending in sitting (T3), long jump from a place (T4), manual dynamometry (T5).

In tab. (13) we present the achieved results in nine tests of physical performance (T1 - T9) achieved by girls in the 4th year. In tab. (14) we offer the results of tests of motor skills of 2nd year girls. In tab. (15) we can see the evaluation of hypothesis (H5) by Student's t-test. Next, we comment on the achieved results of individual tests. The first motor test: the "flamingo" balance test (T1) was passed better by girls in the 4th year, although we cannot talk about statistically significant values in this test. Test: plate tapping (T2) was also completed more successfully by girls of the 4th year, but in this case we are talking about statistically significant values at $p < 0.01$, $p < 0.05$ and $p < 0.1$. The third motor test: forward bending in sitting (T3) was passed better by girls in the 2nd year, although we cannot say that these are statistically significant results. It is interesting

that in the tests: (T4), (T5), (T6), (T7) the girls of the 4th grade were more successful. We observe statistically significant values in the test: long jump from a place (T4) at $p < 0.05$ and $p < 0.10$ and also in the test: manual dynamometry (T5) at $p < 0.01$, $p < 0.05$ $iP < 0.1$. In the last two tests (T8) and (T9) the girls of the 2nd year were more successful. In the test: the shuttle run (T8) we can talk about statistically significant data at $p < 0.05$ and p

< 0.1 . The last hypothesis (H5) was confirmed to us, as the girls of the 4th year showed higher performance in six (6) tests, while the girls of the 2nd year only in three (3) tests. We measured statistically significant values in: test: plate tapping (T2), long jump from a place (T4), manual dynamometry (T5), shuttle run (T9).

Table 13 Evaluation of achieved results - girls of 4th year (H5)

4th	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	1,55	6	1	0	42,72	1,29	0	6	1,53	1,56
T2	13,11	6,3	12,96	{14.4, 11.1, 12.7, 13.7}	45,07	1,36	10,2	16,5	1,62	1,64
T3	1,62	29	2	0	213,87	6,48	-10	19	7,94	8,07
T4	121,85	72	124	130	401,15	12,15	92	164	15,37	15,61
T5	19,76	15	19	{16, 18, 20}	109,75	3,32	13	28	4,03	4,09
T6	21,39	14	21	20	98,96	2,99	15	29	3,62	3,68
T7	6,25	24,9	4,2	0	182,35	5,52	0	24,9	6,66	6,78
T8	25,67	10,6	26,4	{24.4, 28.9, 26.6}	77,23	2,34	18,9	29,5	2,86	2,19
T9	65,94	283,6	60	{40.4, 59.6}	841,68	25,50	14,1	297,7	46,32	47,04

Table 14 Evaluation of achieved results - girls of 2nd year (H5)

2nd	\bar{x}	R_x	med(x)	mod(x)	d	\bar{d}_x	Min.	Max.	σ	s
T1	1,62	6,0	1	0	18,61	1,43	0	6	1,73	1,80
T2	16,76	15,8	15,7	13,6	42,90	3,30	11,2	27	4,15	4,32
T3	2,08	23,0	5	{6, 5}	84,76	6,52	-11	12	7,46	7,77
T4	108,46	47	105	104	166,46	12,80	88	135	15,10	15,72
T5	14,62	10	14	14	24,61	1,89	11	21	2,49	2,59
T6	19,92	30	18	16	78,46	6,03	10	40	8,02	8,35
T7	4,16	18,7	3,6	0	42,38	3,26	0	18,7	4,82	5,02
T8	23,17	15,0	23,8	{13.7, 20.7, 20.8, 22.8, 23.2, 23.3, 23.8, 23.9, 24, 24.9, 25, 26.4, 28.7}	29,35	2,25	13,7	2,25	3,40	3,54
T9	79,57	97,6	72,5	72,5	278,24	21,40	43,4	141	27,12	28,23

Table 15 Evaluation of hypothesis (H5) by t-test

Test	σ^2	S_x^2	σ	d	H.t.	H.p.	$p < 0,01$	$p < 0,05$	$p < 0,1$	Evaluation
T1	2,55	2,66	1,59	1,63	-0,130	896516	-	-	-	4th
T2	9,45	7,06	3,07	2,65	-4,194	0,0013	S.	S.	S.	4th
T3	61,11	63,85	7,81	7,99	-0,174	862536	-	-	-	2nd
T4	270,40	244,72	16,44	15,64	2,613	0,12225	-	S.	S.	4th
T5	18,77	14,03	4,33	3,74	4,193	0,00131	S.	S.	S.	4th
T6	28,06	28,88	5,29	5,37	0,835	407776	-	-	-	4th
T7	39,33	40,2	6,27	6,34	1,006	319609	-	-	-	4th
T8	10,44	9,6	3,23	3,09	2,468	0,17528	-	S.	S.	2nd
T9	1785,24	1827,0	42,25	42,74	-0,973	335437	-	-	-	2nd

3.2 Comparison of the tests' results of motor skills of children from our group with other groups

When comparing the results of our group of children from primary schools Sládkovičovo and Veľké Úľany (Set of primary schools SL + VÚ) and children from the group Moravec et al.

2002 - (Eurofit) and the sample of Perič et al. 2010 - (Sports talent) we present some differences. However, it should be noted that in the sample of the author Perič et al. 2010 - (Sports talent) talented individuals were tested and therefore we present this set only for interest. We compared the results in all nine tests (T1 - T9) separately for boys and girls.

Table 16 Comparison of test results of our group with other girls - boys

Boys							
Test	Group	4th			2nd		
		\bar{x}	n	s	\bar{x}	n	s
T1	Group ZŠ SL+VÚ	1,32	34	1,75	2,58	24	2,76
	Eurofit	12,28	74	7,01	18,05	73	7,79
	Sports Talent	-	-	-	-	-	-
T2	Group ZŠ SL+VÚ	12,82	34	1,79	15,09	24	4,21
	Eurofit	16,91	74	3,13	18,99	73	3,01
	Sports Talent	-	-	-	-	-	-
T3	Group ZŠ SL+VÚ	0,7	34	6,51	3,41	24	7,75
	Eurofit	20,19	74	5,54	19,85	73	5,01
	Sports Talent	8	-	-	10	-	-
T4	Group ZŠ SL+VÚ	137,11	34	22,79	125,83	24	19,84
	Eurofit	149,3	74	17,87	132,52	73	16,38
	Sports Talent	176	-	-	158	-	-
T5	Group ZŠ SL+VÚ	23,147	34	5,45	20,24	24	6,18
	Eurofit	22,03	74	4,22	17,67	73	3,94
	Sports Talent	-	-	-	-	-	-

T6	Group ZŠ SL+VÚ	21,88	34	5,04	21,04	24	6,45
	Eurofit	21,28	74	5,23	19,01	73	5,09
	Sports Talent	22	-	-	20	-	-
T7	Group ZŠ SL+VÚ	12,53	34	16,01	11,87	24	9,54
	Eurofit	19,17	74	14,38	9,9	73	10,33
	Sports Talent	24	-	-	22	-	-
T8	Group ZŠ SL+VÚ	42,13	34	2,9	23,13	24	3,4
	Eurofit	22,73	74	2,38	24,2	73	2,71
	Sports Talent	11,2	-	-	11,7	-	-
T9	Group ZŠ SL+VÚ	84,26	34	67,78	78,16	24	38,23
	Eurofit	335	74	1,62	286	73	1,23
	Sports Talent	-	-	-	-	-	-

In tab. (16) we present a comparison of the results of the mentioned three groups of boys. The first two sets are from the general population and the third set is listed for interest due to the fact that it has talented individuals. Here it is very likely that these individuals will be the most successful. Next, we comment on the achieved results of individual tests. In the first test: the "flamingo" balance test (T1), our group (ZŠ SL + VÚ) was more successful than the group (Eurofit). In the test: plate tapping (T2) again the boys from our group achieved better results compared to the group (Eurofit). In the third test: the forward bending in sitting (T3) group (Eurofit) was more successful compared to our group. They were even the most successful of the three ensembles. In the test: long jump (T4) the students we tested were the least successful, then the boys from the group (Eurofit) and the most successful was the group (Sports Talent), where we noticed a significant difference compared to the previous two groups. In the fifth test: manual dynamometry (T5) the set (Eurofit) was more successful than our set. In the test: lie down-sit up (T6) we encounter an interesting result. Our sample (ZŠ SL + VÚ) of boys of the 2nd year achieved better results compared to the sample (Sports Talent). In the test: endurance pull-up (T7), our group was the weakest in the 4th year. However, our 2nd year boys were more successful than the boys from the group (Eurofit). However, the values achieved by the sample (Sports Talent) are significantly better than the other two groups. In the penultimate test: the shuttle run (T8) 4th from the group (Eurofit) achieved a faster time than our group, but the boys of the 2nd year from our group were more successful than the group (Eurofit). The group (Sports Talent) was again by far the most successful. In the final evaluation, we state that in the evaluation of motor skills tests, children of the 4th year of the group (Eurofit) showed higher performance, they were more successful in five (5) tests, while the children tested by us in four (4) tests. When comparing the 2nd year, the group (Eurofit) demonstrated higher performance in six (6) tests. Our group (ZŠ SL + VÚ) only in three (3) tests of motor skills. As we compared two groups (2nd and 4th year) together in eighteen (18) tests, in conclusion it should be noted that in ten (10) tests the boys we tested (ZŠ SL + VÚ) showed higher performance and in eight (8) tests the boys from group (Eurofit). We state that the boys of our group (ZŠ SL + VÚ) were more successful compared to the group of boys (Eurofit). However, the most successful of all three groups of boys was the group (Sports Talent), which achieved significantly better results in almost all tests compared to the other two groups (Tab. 16).

In tab. (17) we present a comparison of the results of the mentioned three groups of girls. Then, we comment on the achieved results of individual tests. During the test: the balance test "flamingo" (T1) was the most successful our group of girls (elementary school SL + VÚ). Test: our group of girls passed the plate tapping (T2) most successfully. During the test: the forward bend in sitting (T3) was the most successful group (Eurofit), followed by the group (Sports Talent) and the girls of our sample finished in the last place. In the test: the long jump

from a place (T4) the most successful girls were in the group (Eurofit). In the fifth test: manual dynamometry (T5) was again the most successful group of girls (Eurofit). In the sixth test: lie down-sit up (T6) was the most successful our group of girls (ZŠ SL + VÚ), followed by the group (Eurofit) and then the group (Sports Talent). In the test: endurance pull-up (T7) the girls of the group (Sports Talent) were significantly the most successful, followed by the group (Eurofit) and our group finished last. In the eighth test: the shuttle run (T8) were again by far the most successful girls from the group (Sports Talent). In this test (T8) the fourths of the set (Eurofit) were more successful than our sample, but the seconds of our sample were more successful than the sample (Eurofit). In the ninth test: the endurance shuttle run (T9) was more successful group (Eurofit) than our group. In conclusion, we state that our group of girls (SL + VÚ primary school) was more successful in seven (7) motor tests compared to the group (Eurofit), which was, however, more successful in eleven (11) motor tests. We state that overall, the group of girls (Eurofit) was more successful. We did not include the group of girls (Sports Talent) in this comparison. In the overall comparison of the groups of boys and girls of the two groups, our group (ZŠ SL + VÚ) was more successful in seventeen (17) motor tests and the group (Eurofit) was more successful in nineteen (19) motor tests. In this overall comparison, the group (Eurofit) was more successful than our group (Tab. 17).

In our article, we consider some facts to be interesting: in five hypotheses we achieved statistically significant results up to 4 times, although always at a different level of significance in the following tests: plate tapping (T2), long jump from a place (T4) and manual dynamometry (T5). When comparing the results of motor skills of older children with younger children in our study group, younger children achieved better performance in the test: forward bending in sitting (T3) compared to older children. When comparing the boys and girls of our group (ZŠ SL + VÚ) with the group Moravec et al. 2002 - (Eurofit) and Perič et al. 2010 - (Sports talent) we came to an interesting finding and that our group (ZŠ SL + VÚ) of boys and girls of the 2nd year achieved more successful results in the test: lie down - sit up (T6) than the group (Eurofit) and the group (Sports talent). The boys of the 4th year were also very close to being more successful than the two mentioned groups. In summarizing the results from all nine motor tests, the boys in our group were more successful than the boys in the group (Eurofit). When evaluating the group of girls, we came to the conclusion that the girls of the group (Eurofit) showed higher performance in motor tests than our group of girls. When comparing fourths, regardless of gender, the children of the group (Eurofit) performed higher in the tests of physical fitness and physical performance. We showed higher performance of our children in 2nd year than in the children of the group (Eurofit). In tab. (16, 17) in the overall comparison of the achieved results between our tested children and those examined by Moravec et al. 2002 - (Eurofit) we state that tests of motor skills showed higher performance in children of the group Moravec et al. 2002 - (Eurofit).

Table 17 Comparison of test results of our group with other groups - girls

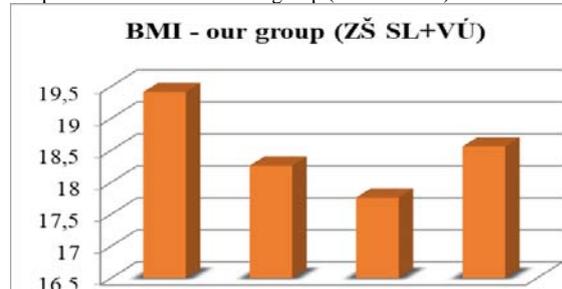
Girls							
Test	Group	4th			2nd		
		\bar{x}	<i>n</i>	<i>s</i>	\bar{x}	<i>n</i>	<i>s</i>
T1	Group ZŠ SL+VÚ	1,54	33	1,56	1,61	13	1,8
	Eurofit	11,36	75	7,25	17,72	71	9,87

	Sports Talent	-	-	-	-	-	-
T2	Group ZŠ SL+VÚ	13,11	33	1,64	16,76	13	4,15
	Eurofit	16,11	75	2,30	17,45	71	2,21
	Sports Talent	-	-	-	-	-	-
T3	Group ZŠ SL+VÚ	1,62	33	8,07	2,07	13	7,77
	Eurofit	22,92	75	5,2	20,83	71	5,78
	Sports Talent	14	-	-	12	-	-
T4	Group ZŠ SL+VÚ	121,84	33	15,61	108,46	13	15,72
	Eurofit	140,36	75	16,16	123,46	71	15,76
	Sports Talent	170	-	-	152	-	-
T5	Group ZŠ SL+VÚ	19,75	33	4,09	14,61	13	2,59
	Eurofit	20,37	75	4,85	14,79	71	3,33
	Sports Talent	-	-	-	-	-	-
T6	Group ZŠ SL+VÚ	21,39	33	3,68	19,92	13	8,35
	Eurofit	21,17	75	4,48	17,61	71	5,85
	Sports Talent	20	-	-	18	-	-
T7	Group ZŠ SL+VÚ	6,25	33	6,66	4,16	13	5,02
	Eurofit	8,93	75	7,37	8,92	71	6,87
	Sports Talent	15	-	-	13	-	-
T8	Group ZŠ SL+VÚ	25,67	33	2,91	23,16	13	3,54
	Eurofit	23,34	75	1,71	26,00	71	3,98
	Sports Talent	11,7	-	-	12,2	-	-
T9	Group ZŠ SL+VÚ	65,93	33	47,04	79,56	13	28,23
	Eurofit	297	75	1,35	236	71	0,94
	Sports Talent	-	-	-	-	-	-

3.3 Comparison of body weight and body height of children of our group (ZŠ SL + VÚ) and children of the group Moravec et al. 2002 - (Eurofit)

In graph (1) we present the evaluation of the weight-height index: Body Mass Index (BMI) of the children of our group in primary education (ZŠ SL + VÚ). From graph (1) we can read that boys in the 4th year have an average (BMI) of 19.41, which

Graph 1 BMI evaluation - our group (ZŠ SL + VÚ).



In tab. (18) we evaluate the weight of our group using the statistical method t-test. We are based on previous

Table 18 Evaluation of the weight of our group (ZŠ SL + VÚ) - (t-test)

Weight	s^2	S_2^2	σ	s	H.t.	H.p.	p<0,01	p<0,05	p<0,1
ZŠ SL 4th & 2nd ZŠ VÚ 4th & 2nd	107,47	108,64	10,36	10,42	-0,831	407153	-	-	-
ZŠ SL 4th ZŠ VÚ 4th	112,72	114,07	10,61	10,68	-1,052	296148	-	-	-
ZŠ SL 2nd ZŠ VÚ 2nd	84,58	88,08	9,19	9,38	-0,412	681652	-	-	-
ZŠ SL 4th B ZŠ VÚ 4th B	111,83	115,86	10,57	10,76	-0,845	403398	-	-	-
ZŠ SL 4th G ZŠ VÚ 4th G	106,83	111,08	10,33	10,53	-0,714	479144	-	-	-
ZŠ SL 4th ZŠ SL 2nd	130,81	130,72	11,43	11,53	1,431	157231	-	-	-
ZŠ VU 4th ZŠ VU 2nd	78,62	73,17	8,86	8,55	2,484	0,1609	-	S.	S.

In tab. (19) we evaluate the body height of our group using the statistical method t-test. We are based on previous measurements, where we compared the body height of our group (ZŠ SL + VÚ), which consisted of primary schools in the town of Sládkovičovo and in the village of Velké Úřany. We

indicates a normal weight. The boys of the 2nd year are underweight with a value of 18.26. The opposite gender, 4th year girls, have a BMI of 17.76, which also means underweight. Girls attending 2nd year have a BMI of 18.56, which means normal weight. In assessing BMI, we came to the fact that, on average, children reached underweight and normal weight. The average BMI never showed overweight or obesity, either I., II., or III. degree.

measurements, where we compared the body weight of our group (ZŠ SL + VÚ), which consisted of primary schools in the town of Sládkovičovo and in the village of Velké Úřany. We performed measurements between years and gender. We created 7 groups, among which we compared the average body weight and body height. The highest body weight was found by the boys of the 4th year from Velké Úřany, namely: 39.87 kg and the lowest by the boys of the 2nd year from Sládkovičovo, namely: 30.77. We achieved statistically significant values when we compared the children of the 4th year with the children of the 2nd year from the primary school in Velké Úřany. The results were significant even at $p < 0.05$. We can talk about statistically significant values in this case when comparing body weight between 4th grade and 2nd grade students from Velké Úřany. These results are significant at $p < 0.05$ and $p < 0.1$.

performed measurements between years and gender. We created 7 groups, among which we compared the average body weight and body height. The highest body height was reached by the boys of the 4th year from Velké Úřany, namely: 141.47 cm. On average, the lowest children were from the village from the 2nd

year with a height of 130.88 cm. We achieved statistically significant results when comparing body height of children of the 4th and 2nd year from Sládkovičov and also of children of the 4th and 2nd year from Veľké Úľany. Statistically significant results were already in both cases at $p < 0.01$. We can talk about

statistically significant results when we compared body height between 4th and 2nd years pupils at the Primary School in Sládkovičov and subsequently between 4th and 2nd year pupils at both schools. In both cases, these are statistically significant results at $p < 0.01$, $p < 0.05$ and $p < 0.1$.

Table 19 Evaluation of the body height of our group (ZŠ SL + VÚ) - (t-test)

Body height	σ^2	S_x^2	σ	s	H.t.	H.p.	p<0,01	p<0,05	p<0,1
ZŠ SL 4th & 2nd ZŠ VÚ 4th & 2nd	56,28	57,11	7,5	7,55	0,484	62916	-	-	-
ZŠ SL 4th ZŠ VÚ 4th	35,72	36,64	5,97	6,05	-0,392	695575	-	-	-
ZŠ SL 2nd ZŠ VÚ 2nd	39,50	41,22	6,28	6,42	0,209	835201	-	-	-
ZŠ SL 4th B ZŠ VÚ 4th B	34,50	36,24	5,87	6,01	-0,567	574293	-	-	-
ZŠ SL 4th G ZŠ VÚ 4th G	35,81	37,75	5,98	6,14	-0,017	986116	-	-	-
ZŠ SL 4th ZŠ SL 2nd	58,93	43,96	7,67	7,73	4,878	0,0001	S.	S.	S.
ZŠ VÚ 4th ZŠ VÚ 2nd	53,06	32,14	7,28	7,34	6,253	0,0001	S.	S.	S.

In tab. (20) we compare the body weight and body height of the boys of our group (ZŠ SL + VÚ) and the group Moravec et al. 2002 - (Eurofit). We can draw the following findings. The body weight of the boys in our group in the 4th and 2nd year is higher than of the boys in the group (Eurofit). In terms of body height,

the boys of the 4th year of the group (Eurofit) are taller than the boys of our group. On the contrary, the boys of the 2nd year of our group are taller than the boys of the 2nd year of the group (Eurofit).

Table 20 Comparison of body weight and body height - boys

		4th boys			2nd boys		
		\bar{x}	n	s	\bar{x}	n	s
Body weight	Group ZŠ SL+VÚ	38,05	37	10,72	31,35	29	8,81
	Eurofit	36,35	108	9,82	26,29	73	4,93
Body height	Group ZŠ SL+VÚ	140,8	37	5,95	131,24	29	5,64
	Eurofit	143,52	108	7,97	127,76	73	5,85

In tab. (21) we compare the body weight and body height of the girls in our group (ZŠ SL + VÚ) and the group Moravec et al. 2002 - (Eurofit). We can draw the following findings. The body weight of girls in the 4th and 2nd year of our group is higher

compared to girls in the 4th and 2nd year of the group (Eurofit). The body height of the girls of the 4th and 2nd year of our group is also higher compared to the girls of the 4th and 2nd year of the group (Eurofit).

Table 21 Comparison of body weight and body height - girls

		4th girls			2nd girls		
		\bar{x}	n	s	\bar{x}	n	s
Body weight	Group ZŠ SL+VÚ	34,33	39	10,47	31,38	18	10,26
	Eurofit	33,13	75	6,53	25,4	71	5,74
Body height	Group ZŠ SL+VÚ	139,33	39	6,06	130,77	18	7,51
	Eurofit	138,36	75	6,91	125,83	71	6,48

4 Conclusion

In our article, we tried to approach the issue of physical performance of children in primary education. The tested group consisted of boys and girls of the fourth and second year at the 1st stage of primary school. In a sample of 104 pupils, we diagnosed their motor skills using a comprehensive Eurofit test battery, which consisted of nine tests. The goal of the paper was to evaluate and compare the motor skills of children of younger school age in the village and in the city. The monitoring took place at two primary schools, in the town of Sládkovičov (Slovakia) and in the village of Veľké Úľany (Slovakia). Based on the use of nine motor tests, using statistical indicators of parametric paired t-test, we demonstrated statistically higher performance of children from the city, compared to children from the village. At the same time, tests of motor skills showed us higher performance of children in the fourth year compared to children in the second year - as well as in testing boys and girls. We also measured higher physical performance of boys as a whole comparing to girls. The article also brings a comparison of motor skills of the examined group with groups of other authors.

We also consider as interesting finding that with five hypotheses we achieved statistically significant results up to 4 times, although always at a different level of significance in the following tests: plate tapping (T2), long jump from a place (T4) and hand dynamometers (T5). When comparing the results of motor skills of older children with younger children in our study group, younger children always achieved better performance in the test: forward bending in sitting (T3) than older children.

In the overall comparison of the achieved results between our tested children and those examined by R. Moravec et al. 2002 (Eurofit) we state that tests of motor skills showed higher performance of children tested in the group Moravec et al. 2002 (Eurofit). When comparing our group with the file of Perič et al. (2010), who tested talented individuals, we found that this group demonstrated higher performance in motor skills than our group, only when performing the test: lie down-sit up (T6). The boys of the 2nd year examined by us performed on average more repetitions in the test than the children of the Perič group (2010), who are considered to be sports-gifted.

The article also brings an evaluation and comparison of body height and body weight of children in our research group (ZŠ SL + VU), but also a comparison with somatometric indicators of other groups, which were monitored by other authors. When

comparing body height and body weight, which we and the authors R. Moravec et al. 2002 (Eurofit), we can state that the body weight of boys and girls of the 2nd and 4th year of our group (SL and VU) is higher than the group of Moravec et al., 2002 (Eurofit). We noticed an exception only for boys in the 4th grade, where children tested by Moravec et al. 2002 (Eurofit) are taller by less than a centimeter. We achieved statistically significant results when comparing body height of children in the 4th and 2nd year from Sládkovičovo (Slovakia) and also of children in the 4th and 2nd year from Veľké Úľany (Slovakia). Statistically significant results were already in both cases at $p < 0.01$. In assessing BMI, we came to the fact that, on average, the children in our group reached underweight and normal weight. The average BMI never showed overweight or obesity, either I., II., or III. degree.

Literature:

- Adamčák, Š.: *Pohybové hry a školská telesná a športová výchova*. Banská Bystrica: Univerzita Mateja Bela, 2010. 207 p. ISBN 978-80557-0099-1.
- Antala, B. et al.: *Telesná a športová výchova a súčasná škola*. Bratislava: NŠC, FTVŠ UK, 2014. 343 p. ISBN 978-80-971466-1-0.
- Argaj, G.: *Pohybové hry. Teória a didaktika*. Bratislava: FTVŠ UK, 2016. 2008 p. ISBN 978-80-223-4022-9.
- Barot, T., Burgsteiner, H., & Kolleritsch, W.: Comparison of Discrete Autocorrelation Functions with Regards to Statistical Significance. In: *Advances in Intelligent Systems and Computing. Springer*, 2020. ISSN 2194-5357 (in Print).
- Belešová, M.: Činitele ovplyvňujúce voľný čas mládeže. In: MMK 2012, roč. 3 [elektronický zdroj]. Hradec Králové: Magnanimitas, 2012. pp. 2243-2252 [CD-ROM]. ISBN 978-80-905243-3-0.
- Belešová, M.: Prekonceptie detí o Slovensku. In: *Vedecké snúdie v predprimárnej pedagogike*. Šala: Spoločnosť pre predškolskú výchovu, 2017. pp. 75-82. ISBN 978-80-971016-2-6.
- Belešová, M., Talapková, J.: Základy racionálnej výživy u detí predškolského veku. In *Žiak, pohyb, edukácia: vedecký zborník 2020*. Bratislava: Univerzita Komenského, 2020. pp. 59-64. ISBN 978-80-223-5013-6.
- Belešová, M.: *Primárne vzdelávanie v teórii a v praxi*. Bratislava: Vydavateľstvo Univerzity Komenského, 2018. 192 p. ISBN 978-80-223-4577-4.
- Bence, L.: *Telesný rozvoj, pohybová výkonnosť a humanizácia vyučovania školskej telesnej výchovy na ZŠ*. Banská Bystrica: Univerzita Mateja Bela Fakulta humanitných vied, 2011. 63 p. ISBN 978-80-557-0131-8.
- Cieslar, M.; Koudela, T., Pienias, G., Barot, T.: Identification of Similarities in Approaches to Paired Comparisons in Visual Arts Education. In: *Advances in Intelligent Systems and Computing. Springer*, 2020. ISSN 2194-5357 (Accepted).
- Čavojský, I.: Žiaci primárneho vzdelávania a ich vzťah k učiteľovi ako autorite In: *Integratívny prístup v primárnom vzdelávaní*. Liberec: Technická univerzita v Liberci, 2015. pp. 64-70.
- Gauthier, T. D., Hawley, M. E.: Statistical Methods. In: *Introduction to Environmental Forensics: Third Edition*, 2015. pp. 99-148.
- Gorajska, M., Stando, J., Gunčaga, J.: The Influence of Birth Order on the Results of the State E-Test in Mathematics. In: (Smyrnova Trybulska, E., Ed.) *E-Learning and Smart Learning Environment for the Preparation of New Generation Specialists, Book Series: E-learning*, 2018. 10. pp. 199-219.
- Gregor, T.: *Psychológia športu*. Bratislava: Mauro Slovakia, 2013. 400 p. ISBN 978-80-9680927-9.
- Gregor, T. Vplyv telesného pohybu na psychické zdravie In: *Revue medicíny v praxi*, 2007. roč. 5, č. 1. pp. 29-38.
- Gunčaga, J., Zawadowski, W., Prodromou, T.: Visualisation of Selected Mathematics Concepts with Computers - the Case of Torricelli's Method and Statistics. In: *European Journal of Contemporary Education*, 2019. 8 (1), pp. 69-91.
- Horváth, R. et al.: *Výber športových talentov*. Prešov: Vydavateľstvo Prešovskej univerzity, 2016. 207 p. ISBN 978-80-555-1751-3.
- Horváth, R. et al.: *Diagnostika motorickej výkonnosti a genetických predpokladov pre šport*. Prešov: PU v Prešove, 2010. ISBN 978-80-555-0270-0.
- Hrčka, J., Kovářová, M., Beňačka, J.: *Pohybová aktivita edukantov fyzioterapie vo voľnom čase a jej reflexia na vybraných zdatnostných a zdravotných charakteristikách*. Trnava: UCM, 2011. 151 p. ISBN 978-80-8105-323-8.
- Jakabčič, I.: *Základy vývinovej psychológie*. Bratislava: IRIS, 2002. 83 p. ISBN 80-89018-34-13.
- Kampmillerová, L.: Športové výcviky v základnej škole. Bratislava: Raabe, 2015. 133 p. ISBN 9788081401992.
- Kitchenham, B., Madeyski, L., Budgen, D. et al.: Robust Statistical Methods for Empirical Software Engineering. In: *Empirical Software Engineering*, 2017. 22 (2), pp. 579-630. 133 p. ISBN 9788081401992.
- Kompán, J. et al.: *Súčasný stav a nové trendy v hodnotení telesnej zdatnosti a pohybovej výkonnosti žiakov základných škôl*. Banská Bystrica: Fakulta humanitných vied Univerzity Mateja Bela, 2009. 201 p. ISBN 978-80-8083-887-4.
- Kostrub, D.: *Základy kvalitatívnej metodológie – keď interpretované významy znamenajú viac ako vysoké čísla*. Bratislava: PdF UK, 2016. 161 p. ISBN 978-80-223-4166-0.
- Kováčová V.: *Diagnostika motorických schopností testami Eurofit u detí mladšieho školského veku (rigorózna práca)* Bratislava: PdF UK (rigorózna práca). Bratislava, PdF UK, 2020. 133 p.
- Merica, M.: Effect of Stretching on Sports performance in Softball. In: *Sportivnye igry v fizičeskom vospitanii, rekreacii i sporte: zborník z medzinárodnej vedeckej konferencie*. Smolensk : SGAFKST, 2018. pp. 119-121.
- Miňová, M.: *Teória a prax telesnej výchovy v materskej škole*. Prešov: Prešovská univerzita v Prešove, 2014. 158 p. ISBN 978-80-555-1168-9. EAN 97888055511689.
- Moravec, R., Kampmiller, T., Sedláček, J. et al.: *Eurofit. Telesný rozvoj a pohybová výkonnosť školskej populácie na Slovensku*. Bratislava: SVSpreTVaŠ, 2002. 180 p. ISBN 80-89075-11-8.
- Oravcová, J.: *Vývinová psychológia*. Banská Bystrica: Univerzita Mateja Bela, 2010, 232 s. ISBN 978-80-80839-37-6.
- Severini, E.: Samostatnosť dieťaťa vo výskumných interpretáciách rodičov = Child's autonomy in parent's research interpretations. In: *Terazniejszosc i przyszlosc edukacji dzieci, mlodziwie i doroslych wybrane problemy*. Siedlce: Akka, 2018. pp. 67-87. ISBN 978-83-948104-7-4.
- Severini, E., Kostrub, D.: *Kvalitatívne skúmanie v predprimárnom vzdelávaní*. Prešov: Rokus, 2018. 182 p. ISBN 978-80-895-1071-9.
- Šimonek, J. et al. (2014). *Metodická príručka telesnej výchovy pre materské školy a prvý stupeň základných škôl*. Bratislava: AT Publishing, 2014. 140 p. ISBN 978-80-88954-62-0.
- Šimonek, J.: *Testy pohybových schopností*. Nitra: UKF, 2012. 194 p. ISBN 978-80-970857-6-6.

Primary Paper Section: A

Secondary Paper Section: AK

SUSTAINABLE MENTAL MOBILITY FOR PROFESSIONAL LEADERSHIP IN SECURITY ENVIRONMENT

^aEVA AMBROZOVÁ, ^bDAVID ULLRICH, ^cJIŘÍ KOLEŇÁK,
^dPAVEL SLÁDEK, ^eJAN ZEŽULA, ^fFRANTIŠEK
MILICHOVSKÝ

^{a,b,d,e}Brno University of Defence, Faculty of Military Leadership,
Kounicova 65, 662 10 Brno, Czech Republic

^cNewton University, a.s., 5. května 1640/65, 140 00 Praha 4,
Czech Republic

^fBrno University of Technology, Faculty of Business and
Management, Department of management, Kolejní 2906/4,
612 00 Brno, Czech Republic

email: ^aeva.ambrozova@unob.cz; ^bdavid.ullrich@unob.cz;
^cjiri.kolenak@newton.university; ^dpavel.sladek@unob.cz;
^ejan.zezula@unob.cz; ^fmilichovsky@fbm.vutbr.cz

Abstract: An important subtle skill is the individual's mental mobility. The issue of identifying and developing this mental mobility opens up new opportunities to penetrate the core competencies of an individual. The objective of the paper is create factors, explaining individual elements of leadership in security environment. We have generated partial factors related to the professional leadership (mental mobility on the manager and relationship continuum) using a factor analysis statistical processing of data from the selected items of GPOP questionnaire which is based on the Myers-Briggs Type Indicator (MBTI). The sample consisted of 208 respondents from the security environment. Results of factor analysis include seven factors, which explain 73.799% of variances of all variables. It resulted in the identification of 3 factors.

Keywords: Human sustainability, professional leadership, security, personal potentials, MBTI, GPOP

1 Introduction

Contemporary environment (life, business, industry, corporate, military, security, etc.) is by its nature artificial because it is created by human thinking, cognition, and behavior. With the ongoing fourth industrial revolution, this environment starts to be referred to as Industry 4.0. (Lu, 2017; Vaidya et al., 2018). This environment opens new challenges (Prisecaru, 2017) new requirements on management and leader competence-competence for industry 4.0 (Hecklau et al., 2017). The digital world and consequences of technological progress bring changes not only to the area of cognition and decision making (Ambrozová et al., 2015), but also to the field of social relationships and leadership (Bujak, Śliwa, 2016; Shamin et al., 2016).

Permanent attention is given to the problems of leadership, both in professional (business, industry, corporate, military) and academic domain (Carbone et al., 2017; Mikulka et al., 2018a, 2018b; Ullrich et al., 2019). Along with changes brought by the environment of Industry 4.0, there are growing requirements on leader's qualities (Tremaine, 2016), from the performance and effectiveness point of view (Zaharia, 2016) or responsibility, transparency, and others (Bennis, 2007). Organizations are willing to invest significantly in leadership development and training of their employees (Crawford, Kelder, 2019).

1.1 Specification of leadership in context of connatural management

Based on analysis of articles published in the Leadership Quarterly, the most attention received neo-charismatic theories, with transformational and charismatic leadership, and further theories involving cognitive approach, information processing theories and social exchange / relational leadership theories, with leader-member exchange theory (Mikulka et al., 2018a, 2018b; Fusco et al., 2015; Beenen, 2016; Fry et al., 2005; Parris, Peachey, 2013; Cheong et al., 2019; Dinh et al., 2014; Bowen et al., 2003). Individual theories and models of leadership are being explored and empirically verified in the context of contemporary environment demands. A deeper understanding of the influence of leaders in organizations should be based on more complex and diverse approaches to leadership study. A classical division of leadership is focused on soft and hard skills, especially in the

context of identification and further development of competencies is the subject of a number of professional publications (Anderson, Sun, 2017; Lovelace et al., 2019; Kozáková, Saliger, 2019; Hendarman, Cantner, 2018; Laker, Powell, 2011; Culpin, Scott, 2012; MacLachlan, 2019).

Although the theories and models of leadership feature developed a theoretical background and defined competencies, the question is, how to measure and quantify potentials of an individual that would predict possible leader's qualities. Majority of studies is limited to validation of theories, leadership models or comparison of competencies and qualities of leaders (Zaccaro et al., 2018).

In the context of changing security conditions, which are due to higher complexity, unpredictability, dynamic changes, non-linearity, etc., the qualities requirements of professionals working in this environment are increasing, especially in case of military commanders and leaders. Therefore, there is a need to look for other possible approaches that will enable detailed identification of the background of the skills of professionals working in this environment. From this reason, we stretch the traditional model of hard and soft skills by the so-called subtle skills (Culpin, Scott, 2012; MacLachlan, 2019).

Connatural management approach defines subtle skills as capabilities related to the natural potential of individuals creating one complex of a professional leader's qualities. They refer to mental and psychophysical condition, critical, creative, and systemic thinking, they are associated with inner discipline and stability, with the ability to change and transform depending on the situation. Subtle skills create a background for an individual approach to leadership (Raelin, 2016). In this context, we find the approach of monitoring of naturally born leader qualities very effective. The quality of subtle skills can serve as a significant indicator of professional leadership (Steinhoff, 2015; Amin, Kamal, 2016).

We consider professional leadership as an individual's potential and quality, essential for leading humans and human systems. Professional leadership relates to the command, direction, and management of people and human systems, organized from the inner environment of an individual. It can be defined as the quality of an individual saturated with the ability to perform situational performance and mental mobility on the relationship and managerial continuum. Within a relationship continuum, an individual can find himself in three modes: the individual himself, the individual as a member of the system (unit, team, group), or the leader of the system (Hardy et al., 2010).

Managerial continuum presents differentiation of human leadership forms in relation to the requirements of the situation, its conditions, and circumstances, and to the initial task, activity or mission. The dominant forms, specific for defined managerial continuum, are controlling management and leadership. Professional leadership is not considered as a position, but as the quality of an individual's natural potential, relating to an inner style that has the potential of following and significance, and is manifested in interpersonal contact in the ability to adapt to a situation. In this sense, professional leadership is close to situational leadership (Zigarmi, Roberts, 2017; Chapman, 2018) or transformational leadership (Bangari, 2014; Shabane et al., 2017; Pradhan, Jena, 2019).

1.2 Definition of mental mobility

A professional leader can, in terms of socially related aspects of the professional environment, in fulfilling functions or performing activities, fluctuate in three positions: an individual himself, a member of a system (unit, team, group, organization), or a leader of the system. An individual who occupies the position of a leader may find himself, depending on the

environment, situation, and task requirements, in one of the three management modes: controlling, management and leadership. Mental mobility shows the flexible leader's adaptability in a given situational context according to the characteristics of the task assignment. Basic managerial functions are respected from a psychological point of view, cognition, a decision-making, taking action, and sharing information (Ambrozová et al., 2019). In this context, the issue of mental mobility is one of the important issues we paid attention to. We focused on personality potentials that could be used as an indicator of quality and how to identify and measure them. As an initial model, we used the Myers-Briggs Type Indicator (MBTI), enabling a wide range of use. It is a personality model that points out an individual's personality preferences from mental functions point of view (Bents, Blank, 2010). In the MBTI psychometric test is a recognized method, with significant application potential for management and leadership, which is employed since 60's (Gardner, Martinko, 1996; Fekry et al., 2019; Penzias, 2020; Saggino et al., 2001). It is used in many areas from recruitment and selection, education, team-building, and organizational change, to management and leadership development (Dawes, 2004; Harrington, Loffredo, 2010). The findings of the MBTI may be used in organizations for leadership building, finding out best candidate job-fit and organization-fit in the course of recruitment, and also for the training and development of the leaders (Chatterjee, 2014). Within the context of the Gestalt and Person-Centered coaching psychologies, the MBTI is presented as one tool that provides clients with information and insights essential to deepen self- and other-awareness (Bower, 2015; Penzias, 2020). The MBTI, as well-known managerial tool, proves a useful coaching tool, and an instrument in evaluating cognitive skills (Wiater, 2015; Gardner, Martinko, 1996).

2 Materials and Methods

The tested group consisted of 208 respondents from the security environment. They all successfully finished personality developing management courses with an applied method of X-tream (Ullrich et al., 2019a, 2019b). The methodology is focused on identification and evaluation of abilities, natural potentials and personal dispositions in conditions of permanently changing load and challenges of situations and tasks (Ambrozová et al., 2015). The group comprised of 19 women of an average age of 24, and 189 men of an average age of 26.68. Among these 208 respondents there were professional soldiers – students of the University of Defense (n = 117), average age of 23.47, standard error 0.88642; professional soldiers – commanders, degree team – company (n = 61), average age of 29.43, standard error 3.49027; professionals - members of a special unit (n = 30), average age of 27.13, standard error 2.04658. X-tream methods based courses took place from 2013 to 2016 and lasted for 5 days. Data were collected within the process of personal, mental and psychophysical condition diagnostics.

To measure personal potentials for professional leadership we used a standardized technique of questionnaire survey for quantitative research. It is a self-reporting/evaluating questionnaire of personality type „Golden Profiler of Personality“ (GPOP) in a Czech version, which identifies individual personality preferences, that result from two basic approaches of their orientation toward the outer world (introvert and extravert) and four psychological functions, describing receiving of information (intuition and sensory perception) and their processing (thinking and feeling). The questionnaire is based on Jung's typology and works with the same scales as the Myers-Briggs Type Indicator (MBTI) (Wagnerová, 2011; Bents, Blank, 2010). Combinations of individual scale preferences are further elaborated into 16 personality types, which perform a behavior, related to receiving of information, perception, thinking and decision-making, including social relationship context (Havlůj et al., 2009). Our questionnaire contains 116 items with seven grade scale. Results were processed by computer software (Hogrefe Test System 4.0, Fribourg, Switzerland) and expressed in ten global scales, paired to five couples: Extraversion (E) – Introversion (I), Sensing (S) – Intuition (N), Thinking (T) – Feeling (F), Judging (J) –

Perceiving (P), Stress (S) – Release (R). Five constructs of auxiliary scale that describe individual differences more precisely were assigned to each dimension.

Data from hand-written questionnaires were placed to the above-mentioned evaluation program. As standard scores, there were used STens (Standard Tens) reaching values 1 – 10, mean = 5.5, standard error = 2. For statistical data processing global scales were marked by their beginning alphabetic characters (E, I, S, N, T, F, J, P, S, R) and auxiliary scales were labeled with letter G and numerical index 1-60.

To process the data, we used factor analysis, which belongs to multidimensional statistical methods, is mostly used to reduce the data file (Gavora, 2012). The aim was to create new (artificial) variables – factors so that with their minimal numbers we could capture maximal information contained in the original file. The dimension of newly acquired data approached the real value, which was an important prerequisite for further processing.

Factor analysis is based on the selection of correlation and partial correlation coefficients. The correlation coefficient represents the closeness of linear dependence of individual variables and partial correlation coefficients, ranging from -1 to 1. Partial correlation coefficient shows a similarity of two variables in a situation when the other variables are assumed constant. If it is possible to explain the dependence of variables using common factors, the partial correlation coefficients are very small, close to zero (Gavora, 2012; Škaloudová, 2010). To assess the suitability of factor analysis two tests were used:

(1) Kaiser-Meier-Olkin (KMO) is a coefficient which could reach values between 0 a 1. Its value is done by the rate of the square sum of correlation coefficients and square sum of correlation and partial coefficients. The acceptable value is 0.5 and higher, optimal is 1.0.

(2) Usage of Bartlett's Sphericity Test is in testing the zero hypotheses, that correlation matrix of variables is unit (on diagonal are only ones, others are zeros). If the zero hypothesis is rejected, factor analysis could be used for defined variables. The optimal value of Bartlett's Test is 0.0, but values under 5% error are acceptable.

The way to determine the number of factors and the size of the factor loads represent extraction methods of principal components gives non-correlated factors, sorted by their variance. The analysis tries to reduce the number of variables to express the variance of the original variables. If there are high correlations between variables, the total variance can be expressed by one main component. The implementation of this method gives a clear factor solution where the variable uses the highest possible percentage of variance.

For verification of factor analysis, Cronbach's alpha indicator must be used. This indicator is seen as the reliability coefficient, which is used as a kind of analog of the correlation coefficient. Usually, it is possible to reach values in the interval of <0.1>. Zero as extreme value describes a situation, in which individual variables are uncorrelated. On the other hand, the value of 1 describes the correlated variables. When the value is closer to 1, there is reported a higher degree of conformity (Cronbach, 1951; Hrach, Mihola, 2006).

3 Results

Firstly, we have analyzed the items of global and auxiliary scales of the GPOP questionnaire in the context of required qualities of professional leadership, potentially related to the aspects of ability for mental mobility on the managerial continuum (see table 1).

Table 1. Selected items with potential relationship to the aspects of ability for mental mobility

GPOP scales	Selected items
Extraversion (E) Introversion (I)	Energy (E _{G1}), The spirit of an enterprise (E _{G5}), Spontaneity (E _{G6})
Sensing (S) Intuition (N)	Sensing (S _{G13}), Practicality (S _{G14}), Concreteness (S _{G15}), Realistic approach (S _{G16}), Stability (S _{G18}) Intuition (N _{G19}), Innovation (N _{G20}), Imagination (N _{G22}), Change (N _{G24})
Thinking (T) Feeling (F)	Thinking (T _{G25}), Objectivity (T _{G27}), Leadership (T _{G29}), Criticalness (T _{G28}) Empathy (F _{G31})
Judging (J) Perceiving (P)	Judging (J _{G36}), Orientation to decision making (J _{G37}), Structure approach (J _{G39}), Sense for details (J _{G41}) Perceiving (P _{G43}), Orientation on the process (P _{G44}), Sense for a whole (P _{G47}), Openness to the occasions (P _{G48})
Stress (Ss) Release (R)	Skepticism (Ss _{G54}) Equanimity (R _{G57}), Self-confidence (R _{G59}), Positive attitude (R _{G61}), Optimism (R _{G63})

Source: own work by authors

Secondly, we have generated partial factors related to the professional leadership (mental mobility on the manager and relationship continuum) using statistical processing of data from the selected items of GPOP questionnaire. To perform the factor analysis, it was necessary to determine the KMO and Bartlett's Sphericity Test values. The minimum acceptable KMO value is 0.5, and the maximum acceptable Bartlett's Sphericity Test is 0.05. Observed KMO was 0.762 and Bartlett's test value was 0.000. All selected items of GPOP questionnaire served as input to factor analysis.

The result of the factor analysis is the creation of a rotated matrix of components that indicate the saturation power of the individual variables that enter this analysis. Results of factor analysis include seven factors, which explain 73.799% of variances. To determine the resulting equation of the individual factors, we have used the values in the un-rotated matrix. The equation can only be determined if it contains at least two saturation variables (see Table 2).

Table 2. Component matrix and highlighted saturation variables of selected items

	1	2	3	4	5	6	7
E _{G1}	.430	.507	.239	.444	.239	-.310	-.180
E _{G5}	.363	.500	.059	.384	.295	-.366	-.105
E _{G6}	.477	.501	-.050	.315	.173	-.226	-.095
S _{G13}	-.754	.328	.451	-.072	.088	.134	.054
S _{G14}	-.718	.012	.430	.000	.279	.176	-.059
S _{G15}	-.571	.532	.165	-.135	-.150	.013	-.164
S _{G16}	-.520	.452	.475	-.091	.082	-.042	.225
S _{G18}	-.705	.046	.142	.174	.142	.082	.203
N _{G19}	.793	.339	-.174	.139	-.125	.223	.196
N _{G20}	.669	.367	-.227	.133	-.303	.137	.193
N _{G21}	.604	-.109	.072	.216	.142	.294	.318
N _{G22}	.655	-.049	-.266	.160	.206	.343	-.227
N _{G24}	.632	.430	-.013	.003	-.132	.037	-.242
J _{G39}	-.662	.558	-.138	.114	-.169	.185	-.029

Source: own work by authors

Based on the values of the selected items we have calculated their weighting. The sum of these weightings in each factor expresses 100% representation within the relevant factor. To confirm the correctness of the factor analysis we have determined the Cronbach alpha indicator for each factor to verify it. The verification value must be at least 0.5. Individual factors

were designated as G1 – 3 factors. Table 3 shows generated factors G1 – 3, individual equations and Cronbach alpha values.

Table 3. Generated equations for factors and Cronbach alpha values

	Cronbach's alpha
G1 - Factor of situational pragmatic approach	.754
G2 - Factor of proactivity	.885
G3 - Factor of social and situational engagement	.861

Source: own work by authors

The determined equations allow calculating the appropriate Factor value for each participant based on the values of selected items of GPOP questionnaire. Thirdly, we have assigned a term, description, and an equation for calculation of each factor.

G1 – Factor of situational pragmatic approach expresses the relationship between sensing, practicality, concreteness, and orientation to decision-making. The Factor reflects the logical and structured approach to situations and relations characterized by responsibility, methodicalness, realistic approach, and stability. For calculation of this Factor we have created the following equation:

$$G1 = 0.16444 \times S_{G13} + 0.15658 \times S_{G14} + 0.12459 \times S_{G15} + 0.11344 \times S_{G16} + 0.15383 \times S_{G18} - 0.14283 \times N_{G22} + 0.14429 \times J_{G39}$$

Numerical coefficients constitute the weighting of individual variables in the frame of the Factor. Other items: S_{G13} – Sensing, S_{G14} – Practicality, S_{G15} – Concreteness, S_{G16} – Realistic Approach, S_{G18} – Stability, N_{G22} – Imagination, J_{G39} – Structural Approach.

G2 - Factor of proactivity indicates the relationship between intuition, innovation, useful and effective mobility in changing conditions. The Factor characterizes the ability to perceive situations as a complex, with creativity and sense of perception of relations and connections within different or even contradictory appearing phenomena. For calculation of this Factor we have created the following equation:

$$G2 = 0.41983 \times N_{G19} + 0.54834 \times N_{G20} + 0.03183 \times N_{G24}$$

Numerical coefficients constitute the weighting of individual variables in the frame of the factor. Other used items: N_{G19} – intuition, N_{G20} – innovation, N_{G24} – change.

G3 – Factor of social and situational engagement represents the relationship between vigor, the spirit of enterprise and spontaneity, in the sense of the need for the social environment as the background with energizing potential. The Factor reflects social relations and immediate reaction to challenges from surroundings. For calculation of this Factor we have created the following equation:

$$G3 = 0.38838 \times E_{G1} + 0.33568 \times E_{G5} + 0.27594 \times E_{G6}$$

Numerical coefficients constitute the weighting of individual variables in the frame of the factor. Other used items: E_{G1} – energy, E_{G5} – the spirit of enterprise, E_{G6} – spontaneity. Individual factors were calculated for each respondent of a tested group. From these calculated results there were subsequently established values for descriptive statistics (see Table 4).

Table 4. Descriptive statistics of identified factors for professional leadership

	Mean	Variance	Std. error	Min	Max
G1	4.4596	2.5457	1.59554	0.95	8.23
G2	5.2517	4.5741	2.13872	-1.52	10.00
G3	6.0845	3.0031	1.70603	2.15	10.00

Source: own work by authors

Factors can be used in the process of selection of the right individuals for a position, further on in the process of determination of an individual's potential for professional leadership, or to aim further development e.g. additional preparation, advancement, and cultivation of personality potentials and sources. Figure 1 shows the graphical expression of identified factors levels and their variances.

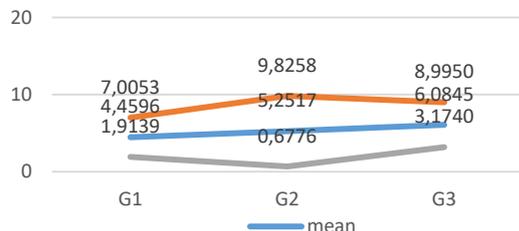


Figure 1. Graphical expression of partial factor values

The interpretation of values can be as follows: individuals reaching lower range results (mean - 1 variance) show lower values in the monitored factors and are likely to feature a lower potential for mental mobility, based on GPOP indicators. The individuals reaching upper range results (mean + 1 variance) show high potential and are likely to feature the potential for mental mobility in the context of professional leadership.

4 Conclusion

The present study deals with the problems of personality potentials for professional leadership evaluation. In our point of view, professional leadership is about the quality of an individual's abilities not about a professional position. In this sense, it differs from the classical concept of leadership.

Searching for its suitable measurement tool we started with the Czech version (GPOP) of the MBTI model because it contains classic attitudes (introversion and extraversion) and four functions (intuition, sensing, thinking and feeling). The reason for this choice, are individual dimensions that can be considered as continua. Each side of the continuum represents a partial quality/function, related to the information intake manner (introversion – extraversion), their processing (sensing – intuition), creation of decision making (thinking and feeling) and lifestyle (perception judging). Continua of individual dimensions represent an environment for possible mental mobility of an individual among respective functions. Individual's ability to use potentials of both continuum functions is given by the measure of their preferences.

Research studies, using the MBTI model are aimed above all to the identification of factors, which may affect the manager's ability to lead his subordinates effectively (Kuchynková, 2015). They follow personality types in the context of expected administration style (Brandt et al., 2013). Other studies focus on the difference between business leaders who are introverts and extroverts (Barnett, 2016). Officers and enlisted members of The U.S. Air Force are looked at individually and collectively. The findings suggest that there are many similarities between officers and enlisted personnel. For example -introversion, sensing, thinking, and judging; they are also predominantly left-brained individuals. Some similarities include officers and enlisted members preferring to work quietly while still exhibiting a realistic problem-solving style (Devlin, Singh, 2010).

However, in our study, we decided to use the measure of individual functional MBTI dimensions preferences for identification of personality potentials for professional leadership. It resulted in the identification of 3 factors (G1 - Factor of situational pragmatic approach, G2 - Factor of proactivity and G3 - Factor of social and situation engagement) and equations for their calculation. Their descriptive statistics arise from the tested group of respondents.

Professional leadership as an ability and competence in security environment is organized from the inner environment of an individual. It emphasizes proactivity, mental mobility, organizational and structural openness, and reclusiveness. It consists of the ability to find the order and structure, to recognize the hidden qualities, principles or relationship of the organization and other potentials of the respective environment. This work presents the first results of personality potential of military and security professional research. Identified factors for professional leadership show the quality of an individual, that can be evaluated both in the context of specific requirements of working positions (selection of people for positions) and in the context of education, development, and cultivation of personality potentials and qualities.

The significance of individual factors, as indicators of personality potentials for relationship and managerial continuum, especially for the modes of the individual as himself, individual as a member of the team, and professional leader can be described as an irrelevant indicator, a relevant indicator, and a significant indicator. G1 - Factor of situational pragmatic approach is considered a significant indicator for the individual as himself mode, a relevant indicator for the modes of the individual as a member of the team, and professional leader. G2 - Factor of proactivity is a significant indicator especially for modes of individual as himself and professional leader. G3 - Factor of social and situational engagement is irrelevant for the mode of individual as himself. On the other hand, it is a significant indicator of the modes of individual as a member of the team and professional leader.

The next step in our research is the monitoring and validation of factors in the practice of military professionals and professionals working in the security environment. In this context, we see as useful, for example, courses or special training for professionals, with the applied X-tream methodology. The methodology is used to simulate stress factors and successful completion of this course is a certain confirmation of the quality of the individual's physical condition, which is monitored in the mental, personal and psychophysical dimension (Koleňák et al., 2016; Wang et al., 2018).

Identified factors for professional leadership highlight individual qualities that can be evaluated both in the context of specific job requirements (e.g., people selection processes for positions), and in the context of education, development, and cultivation of personality potentials and qualities.

Literature:

- Ambrozová, E., Koleňák, J., Ullrich, D., Pokorný, V. (2015). Effectiveness of Competent Decision Making of Professional Managers in the Context of the Modern Corporate Environment and its Requirements for the Quality of Their Skills. In *Proceedings of the 9th International Conference European Entrepreneurship Forum 2015. Efficiency in the Private and the Public Sector*, 6 -22. Praha, Czech Republic: NEWTON Books.
- Ambrozová, E., Pokorný, V., Knap-Stefaniuk, A. (2019). Professional Leadership as Potential and Quality. In: *Proceedings of the 12th International Scientific Conference: European forum of Entrepreneurship*, 7-15. Praha, Czech Republic: NEWTON Academy.
- Amin, S., Kamal, Y. (2016). Impact of Natural Born Leader Qualities on the Project Team Performance: The Influences of Demographics (Gender and Age). *International Journal of Management, Accounting & Economics*, 3(5), 306–318.
- Anderson, M. H., Sun, P. Y. (2017). Reviewing Leadership Styles: Overlaps and the Need for a New 'FuRrange' Theory. *International Journal of Management Reviews*, 19, 76-96. Doi 10.1111/ijmr.12082
- Bangari, R. S. (2014). Establishing A Framework of Transformational Grassroots Military Leadership: Lessons from High-Intensity, High-Risk Operational Environments. *Vikalpa*, 39(3), 13-34. Doi 10.1177/0256090920140302.
- Barnett, M. (2016). The Power of Introverts. *Marketing Week*, 46-47.

7. Beenen, G. (2016). Effective Leadership: Theory, Cases and Applications. *Personnel Psychology*, 69(1), 300-302. Doi 10.1111/peps.12130.
8. Bennis, W. (2007). The challenges of leadership in the modern world: Introduction to the special issue. *American Psychologist*, 62(1), 2-5. Doi 10.1037/0003-066X.62.1.2.
9. Bents, R., Blank, R. (2010). *Understanding The Dynamics of Typical People: An Introduction to Jungian Type Theory*. Cambridge, MA: Hogrefe Publishing.
10. Bowen, P. L., Ferguson, C. B., Lehmann, T. H., Rohde, F. H. (2003). Cognitive style factors affecting database query performance. *International Journal of Accounting Information Systems*, 4(4), 251-273. Doi 10.1016/j.accinf.2003.05.002
11. Bower, K. M. (2015). Coaching with the Myers Briggs Type Indicator: A Valuable Tool for Client Self-Awareness. *Journal of Practical Consulting*, 5(2), 10-18.
12. Brandt, T., Edinger, P., Kultalahti, S. (2013). Personality and Expectations for Leadership. In *Proceedings of the European Conference on Management, Leadership & Governance*, 1-6.
13. Bujak, A., Śliwa, Z. (2016). Global Aspects of Security Environment -- the "One Belt, One Road" Project. *Ekonomia i Prawo*, 15(4), 439-454.
14. Carbone, A., Evans, J., Ross, B., Drew, S., Phelan, L., Lindsay, K., Cottman, C.I., Stoney, S., Ze, J. (2017). Assessing Distributed Leadership for Learning and Teaching Quality: A Multi-Institutional Study. *Journal of Higher Education Policy & Management*, 39(2), 183-196. Doi 10.1080/1360080X.2017.1276629.
15. Chapman, B. (2018). Situational Leadership: A Key Leadership Skill. *Leadership Excellence*, 35(9), 16-17.
16. Chatterjee, D. (2014). Leadership in Innovators and Defenders: The Role of Cognitive Personality Styles. *Industry & Innovation*, 21(5), 430-453. Doi 10.1080/13662716.2014.959314
17. Cheong, M., Yammarino, F. J., Dionne, S. D., Spain, S. M., Tsai, Ch. (2019). A Review of the Effectiveness of Empowering Leadership. *The Leadership Quarterly*, 30(1), 34-58. Doi 10.1016/j.leaqua.2018.08.005.
18. Crawford, J. A., Kelder, J. (2019). Do we measure leadership effectively? Articulating and evaluating scale development psychometrics for best practice. *The Leadership Quarterly*, 30(1), 133-144. Doi 10.1016/j.leaqua.2018.07.001.
19. Cronbach, L. (1951). Coefficient Alpha and The Internal Structure of Tests. *Psychometrika*, 16(3), 297-334. Doi 10.1007/BF02310555.
20. Culpin, V., Scott, H. (2012). The Effectiveness of a Live Case Study Approach: Increasing Knowledge and Understanding of 'Hard' Versus 'Soft' Skills in Executive Education. *Management Learning*, 43(5), 565-577. Doi 10.1177/1350507611431530.
21. Dawes, R. (2004). Time for a critical empirical investigation of the MBTI. *European Business Forum*, (18), 88-89.
22. Devlin, M. S., Singh, A. (2010). MBTI Personality and Hemisphericity of a U.S. Air Force Group. *Leadership & Management in Engineering*, 10(3), 108-120. Doi 10.1061/(ASCE)LM.1943-5630.0000063.
23. Dinh, J. E., Lord, R. G., Gardner, W. L., Meuser, J. D., Liden, R. C., Hu, J. (2014). Leadership Theory and Research in the New Millennium: Current Theoretical Trends and Changing Perspectives. *The Leadership Quarterly*, 25(1), 36-62. Doi 10.1016/j.leaqua.2013.11.005.
24. Fekry, A., Dafoulas, G. A., Ismail, M. (2019). The Relation between Student Behaviours in Group Presentations and their Teamwork Modalities Using Belbin and MBTI Analysis. *Procedia Computer Science*, 164, 292-300. Doi 10.1016/j.procs.2019.12.186
25. Fry, L. W., Vitucci, S., Cedillo, M. (2005). Spiritual Leadership and Army Transformation: Theory, Measurement, and Establishing a Baseline. *The Leadership Quarterly*, 16(5), 835-862.
26. Fusco, T., O'Riordan, S., Palmer, S. (2015). Authentic Leaders are... Conscious, Competent, Confident, and Congruent: A Grounded Theory of Group Coaching and Authentic Leadership Development. *International Coaching Psychology Review*, 10(2), 131-148.
27. Gardner, W. L., Martinko, M. J. (1996). Using the Myers-Briggs Type Indicator to Study Managers: A Literature Review and Research Agenda. *Journal of Management*, 22(1), 45-83. Doi 10.1177/014920639602200103.
28. Gavora, P. (2012). *Tvorba výskumného nástroja pre pedagogické bádanie*. Bratislava, Slovakia: SPN.
29. Hardy, L., Arthur, C. A., Jones, G., Shariff, A., Munnoch, K., Isaacs, I., Allsopp, A. J. (2010). The Relationship Between Transformational Leadership Behaviors, Psychological, and Training Outcomes in Elite Military Recruits. *The Leadership Quarterly*, 21(1), 20-32. Doi 10.1016/j.leaqua.2009.10.002
30. Harrington, R., Loffredo, D. A. (2010). MBTI Personality Type and Other Factors That Relate to Preference for Online Versus Face-To-Face Instruction. *The Internet and Higher Education*, 13(1-2), 89-95. Doi 10.1016/j.iheduc.2009.11.006.4.
31. Havlůj, V., Hoskocová, S., Niederlová, M. (2009). *Dotazník typologie osobnosti – GPOP*. Praha, Czech Republic: Hogrefe – Testcentrum.
32. Hecklau, F., Orth, R., Kidschun, F., Kohl, H. (2017). Human Resources Management: Meta-Study - Analysis of Future Competencies in Industry 4.0. *Proceedings of the International Conference on Intellectual Capital, Knowledge Management & Organizational Learning*, 163-174.
33. Hendarman, A. F., Cantner, U. (2018). Soft Skills, Hard Skills, and Individual Innovativeness. *Eurasian Business Review*, 8(2), 139-169. Doi 10.1007/s40821-017-0076-6.
34. Hrach, K., Mihola, J. (2006). Metodické prístupy ke konstrukci souhrnných ukazatelů. *Statistika*, 86(5), 398-418.
35. Kolečák, J., Ambrozová, E., Pokorný, V. (2016). Connatural Management Approach to Preparation and Development of Individuals in the Business Environment. *Business: Theory and Practice*, 17(2), 81-88. Doi 10.3846/btp.2016.512.
36. Kozáková, E., Saliger, R. (2019). The Role of Emotional Intelligence in Direct Leadership in the Army of the Czech Republic. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 67(1), 265-273. Doi 10.11118/actaun201967010265.
37. Kuchynková, L. (2015). Testing the Effectiveness of Potential Managers' Leadership Styles. In *Proceedings of the European Conference on Management, Leadership & Governance*, 211-216.
38. Laker, D. R., Powell, J. L. (2011). The differences between hard and soft skills and their relative impact on training transfer. *Human Resource Development Quarterly*, 22(1), 111-122. Doi 10.1002/hrdq.20063.
39. Lovelace, J. B., Brett H. N., Julian B. A., Hunter, S. T. (2019). Charismatic, Ideological, & Pragmatic (CIP) Model of Leadership: A Critical Review and Agenda for Future Research. *The Leadership Quarterly*, 30(1), 96-110. Doi 10.1016/j.leaqua.2018.08.001.
40. Lu, Y. (2017). Industry 4.0: A Survey on Technologies, Applications and Open Research Issues. *Journal of Industrial Information Integration*, 6, 1-10. Doi 10.1016/j.jii.2017.04.005
41. MacLachlan, M. (2019). Soft Skills = Hard Results. *Training Journal*, 28-31.
42. Mikulka, Z., Nekvapilová, I., Fedorková, J. (2018a). The use of adventure education methods for the development of communication competency of military leaders from the view of students. In: *ICERI 2018 Proceedings*, 2339-2347. Seville, Spain: IATED.
43. Mikulka, Z., Nekvapilová, I., Fedorková, J. (2018b). Prerequisites for Ethical Leadership in the Army of the Czech Republic. In: *Innovation Management and Education. Excellence through Vision 2020*, 3387-3395. Milan, Italy: International Business Information Management Association.
44. Parris, D.L., Peachey, J.W. (2013) A Systematic Literature Review of Servant Leadership Theory in Organizational Contexts. *Journal of Business Ethics*, 113(3), 377-393. Doi 10.1007/s10551-012-1322-6
45. Penzias A. (2020) Team Learning and Development Using the Myers-Briggs Type Indicator and the Clifton Strengths Finder. *Journal of Radiology Nursing*. 1-2. Doi 10.1016/j.jra.2019.12.013
46. Pradhan, S., Jena, L. K. (2019). Does Meaningful Work Explain the Relationship Between Transformational Leadership and Innovative Work Behaviour? *Vikalpa*, 44(1), 30-40. Doi 10.1177/0256090919832434.

47. Prisecaru, P. (2017). The Challenges of the Industry 4.0. *Global Economic Observer*, 5(1), 66-72. ISSN 2343-9750.
48. Raelin, J. A. (2016). It's Not About The Leaders: It's About The Practice of Leadership. *Organizational Dynamics*, 45 (2), 124-131. Doi 10.1016/j.orgdyn.2016.02.006
49. Saggino, A., Cooper, C., Kline, P. (2001). A confirmatory factor analysis of the Myers+Briggs Type Indicator. *Personality and Individual Differences*, 30(1), 3-9. Doi 10.1016/S0191-8869(00)00004-0
50. Shabane, Z. W., Schultz, C. M., van Hoek, C. E. (2017). Transformational Leadership as a Mediator in The Relationship Between Satisfaction With Remuneration and The Retention of Artisans in The Military. *South African Journal of Human Resource Management*, 15(1), 1-9. Doi 10.4102/sajhrm.v15 i0.923.
51. Shamim, S., Cang, S., Yu, H., Yun, L. (2016). Management Approaches for Industry 4.0: A Human Resource Management Perspective. In: *2016 IEEE Congress on Evolutionary Computation (CEC)*, 5309-5316.
52. Škaloudová, A. (2010). *Faktorová analýza*. <http://userweb.pdf.cuni.cz/kpsp/skalouda/fa/> Accessed 10 September 2017.
53. Steinhoff, R. L. (2015). Natural Born Leaders: Use of a Self-Assessment Tool and Benefits to Coaching and Development. *Journal of Practical Consulting*, 5(2), 19-28. ISSN 1930-806X
54. Tremaine, R. L. (2016). The High Flying Leadership Qualities: What Matters the Most? *Defense Acquisition Research Journal: A Publication of the Defense Acquisition University*, 23(2), 122-150.
55. Ullrich, D., Koleňák, J., Ambrozová, E., Pokorný, V., Milichovský, F. (2019a). Global X-tream Index and its Partial Parameters for Identifying the Level of Potential Individual Characteristics in the Challenging Conditions of a Modern Corporate and Security Environment. *Sustainability*, 11(12), 1-15. Doi 10.3390/su11123325
56. Ullrich, D., Ambrozová, E., Pokorný, V., Koleňák, J. (2019b). Možná úskalí při vzdělávání dospělých pro prostředí, společenost a průmysl 4.0. In: *Proceedings of the 8th International Adult Education Conference*, 51-59. Praha, Czech Republic: ČAS.
57. Vaidya, S., Ambad, P., Bhosle, S. (2018). Industry 4.0 – A Glimpse. *Procedia Manufacturing*, 20, 233-238. Doi 10.1016/j.promfg.2018.02.034.
58. Wagnerová, I. (2011). Dotazník typologie osobnosti – GPOP. *E-psychologie*, 5(1), 83-86.
59. Wang, Z., Xu, H., Liu, Y. (2018). How Does Ethical Leadership Trickle Down? Test of an Integrative Dual-Process Model. *Journal of Business Ethics*, 153(3), 691-705. Doi 10.1007/s10551-016-3361-x.
60. Wang, A.-C., Tsai, C.-Y., Dionne, S. D., Yammarino, F. J., Spain, S. M., Ling, H.-C., Cheng, B.-S. (2018). Benevolence-dominant, authoritarianism-dominant, and classical paternalistic leadership: Testing their relationships with subordinate performance. *Leadership Quarterly*, 29(6), 686-697. Doi 10.1016/j.leaqua.2018.06.002.
61. Wiater, D. M. (2015). From the Editor. *Journal of Practical Consulting*, 5(2), 2.
62. Zaccaro, S. J., Green, J. P., Dubrow, S., Kolze, M. (2018). Leader Individual Differences, Situational Parameters, and Leadership Outcomes: A Comprehensive Review and Integration. *Leadership Quarterly*, 29(1), 2-43. Doi 10.1016/j.leaqua.2017.10.003.
63. Zaharia, D. E. (2016). The Effective Leader's Qualities. *Valahian Journal of Economic Studies*, 7(1), 77-82.
64. Zigarmi, D., Roberts, T. P. (2017). A Test of Three Basic Assumptions of The Situational Leadership® II Model and Their Implications for HRD Practitioners. *European Journal of Training & Development*, 41(3), 241-260. Doi 10.1108/EJTD-05-2016-0035.

Primary Paper Section: A

Secondary Paper Section: AE, ED, KA

MULTIMODAL ASPECTS OF THE BANSKÁ BYSTRICA LINGUISTIC LANDSCAPE

^aMOLNÁROVÁ EVA

Department of German Studies, Faculty of Arts, Matej Bel University, Tajovského 40, 974 01 Banská Bystrica, Slovakia
email: "eva.molnarova@umb.sk

This work was supported by the Slovak Research and Development Agency under the contract No. APVV-18-0115 Language in the City – Documenting the Multimodal Semiosphere of Linguistic Landscapes in Slovakia and in a Comparative Perspective

Abstract: The paper presents linguistic landscape (LL) research into the Banská Bystrica intra-urban space focused specifically on multimodality of the researched objects. The presented partial qualitative synchronous and diachronous analysis of the samples collected at Horná Street and the Námestie SNP Square in the city is a part of the larger project entitled APVV-18-0115 Language in the City – Documenting the Multimodal Semiosphere of Linguistic Landscapes in Slovakia and in a Comparative Perspective.

Keywords: Linguistic Landscape, Sign, Multimodality, Communication, Image, Visual

1 Introduction

The author has been involved in the APVV-18-0115 Language in the City – Documenting the Multimodal Semiosphere of Linguistic Landscapes and in a Comparative Perspective research project since 2019. The project aims to provide a complete comparative documentation and analysis of the linguistic landscape¹ of the four selected intra-urban locations in Slovakia (Bratislava, Banská Bystrica, Banská Štiavnica, Komárno) and compare them with two German (Munich, Erlangen) and two Hungarian cities (Komárom, Békéscsaba). The interdisciplinary project draws from the assumption that a specific intra-urban linguistic landscape represents a semiotic world (semiosphere) defined by high multimodality in both traditional as well as creative aspects of public communication. Partial research results have been published in the *Od textu k prekladu XIV* collection, Part two: Linguistic Landscape (2020) edited by the head investigator in the project, A. Ďuricová, V. Istók and S. J. Tóth (2020, pp. 16-23) have investigated the history of LL research in Komárno and Komárom. The LL analysis of Banská Bystrica has focused on figurative language (Jurčáková, 2020, pp. 29-35), local dialect (Krško, 2020, pp. 36-46), gender-balanced language (Štefaňáková, 2020, pp. 67-85), and surnames in logonyms (Molnárová, 2020, pp. 60-66). P. Jesenská (2020, pp. 24-28) has performed a quantitative and qualitative LL analysis of the Národná Street in Banská Bystrica while Z. Gašová has analysed Bratislava (2020, pp. 69-82) and Z. Dobřík has investigated Banská Štiavnica (2020, pp. 127-138). The aforementioned studies have dealt primarily with language signs. J. Lauková (2020, pp. 47-54) has opened the question of the mutual interaction between text and image and shared perception of visual text in the LL visual semiotics. The research part of the paper presents a qualitative analysis of multimodality and in accordance with the conceptual database of the project, three main variables will be analysed: image/graphic form, colour, and text-image relations. For practical research, the Horná Street located in the historical centre of Banská Bystrica was investigated. The brief diachronous analysis deals with three samples collected at the Námestie SNP Square.

2 Multimodality, multimodality, and image in LL

„Multimodality and multimediality are typical features of today's period. These features interfere in all aspects of human activities. Multidimensional communication has become an obvious part of our life, and visual communication plays a more

and more important role. The importance of modus "image" grows as never before and plays a significant role when perceiving and reflecting facts and events around us“ (Kolečáni Lenčová, 2020, p. 160).

In LL research, multimodality as a term refers to images (signs) that combine with linguistic elements, thus enhancing the informative value of the sign. However, multimodality also incorporates specific forms of written language including the aspects such as font, colour, background, etc. Multimodal Linguistic Landscapes (derived from Bateman's *multimodal linguistics*, 2008) takes into account not only the linguistic units in their linguistically specific, semantic, and graphic forms, but also a broad range of other semiotic units (sign, icon, graph, image, signboard type and mounting, architecture, etc.) and sociodemographic, historical, and economic parameters. In a simplified way, LL modality can be defined as a combination of different sign systems which create content within the given geographic and sociocultural space. The object of LL research is the interaction of language and image in the open public space, mainly from the recipient's viewpoint. However, this interaction is also relevant from the purely pragmatic viewpoint because this is the most frequent combination found in the intra-urban linguistic landscapes.

H. Stöckl (2011, pp. 47-48) has specified the following reasons why images are combined with language:

- From the historical point of view, writing has evolved from image.
- The use of language and images have identical mental representations and involve the same invariants (propositions, scripts, frames, mental models). Multimodal communication is also conditioned by the fact that humans are multisensory beings.
- When the "text" consists of language and image, the communication functions are redistributed between the semiotic systems to compensate for the other's shortcomings. While the images provide visual experience rich in signs, the language can name the specific aspects of this experience and explicitly demand action.

From the semiotic point of view, an image represents a continuous flow of iconic, spatially configured signs. Perception and cognitive processing of images involve rapid, simultaneous, and holistic perception with a powerful effect, therefore images are easy to remember and directly connected with emotions. W. Kroeber-Riel (1993, p. 53) has described them as "schnelle Schüsse ins Gehirn", i.e. having quick and efficient brain impact. The recipient simply compares the perceived forms with their own mental models and practical experience with the semantic concepts. On the other hand, the perception of language is slower, successive, and linear and does not necessarily connect with emotions. In terms of their semantic potential, image is vaguer and polysemous, i.e. semantically overloaded due to the limited space (negation, modality, logical cohesion of statements) G. Kress and T. van Leeuwen (2006, pp. 41-44), have adopted the theoretical notion of "metafunction" from the work of M. Halliday (1994) and specified the three functions of semiotic artifacts. Firstly, images represent cut-outs of the world by showing objects and their actions (ideational metafunction). Secondly, they visualise the relationships between the producer, image, and recipient (interpersonal metafunction). Thirdly, they combine the visual elements into formally cohesive and semantically coherent "text" structure (textual metafunction). To "read" the images, the recipient needs general knowledge (Weltwissen) and a sense for context, but also at least basic knowledge of the ways, principles, and types of visual representation in the given time and culture (Kodewissen) (compare Stöckl, 2010, p. 52; Kolečáni Lenčová, 2017, pp. 17, 22).

¹ One of the first complex definitions of linguistic landscape and the most cited one has been formulated by R. Landry and R. Bourhis (1997, p. 25): „The language of public road signs, advertising billboards, street names, place names, commercial shop signs, and public signs on government buildings combines to form the linguistic landscape of a given territory, region, or urban agglomeration“. The definition and characteristics of the basic LL terms and concepts can be found in the author's previous studies (Molnárová, 2020, pp. 60-66; Lauková – Molnárová, 2020, pp. 97-111).

As already mentioned, LL most frequently combines images and text, therefore two types of perception and cognitive processing take place in the recipient's mind; they can be successive or alternate in different combinations. I. Schulze (2019, pp. 47-57) has analysed a number of models in his study entitled "Bilder-Schilder-Sprache"² to point out the different perception processes. Itti and Koch's (2000) saliency theory distinguishes bottom-up and top-down processes. In the first case, the perception process is controlled by the distinct elements in the aggregate regardless of the recipient's will. For example, the red colour, larger or more distinct font, central placement of the image or text, etc. Top-down perception can take place simultaneously; it is controlled by the recipient who intentionally focuses on certain LL elements in order to achieve a specific goal. Schnotz et al. (2003) have created a model with two different ways of text (*descriptive*) and image (*depictive*) processing which result in the creation of mental models. The results of these processes are subsequently compared and updated in terms of *mapping*. These models provide an interesting starting point for qualitative-quantitative LL research from the producer's point of view, although they require complementary analysis of the logical and semantic relationship between the image and the text. Therefore, I. Schulze (2019, pp. 51-57) has modified the model designed by Martinec and Salway (2005), which will be partially applied in this qualitative analysis. The goal is not a complete quantitative and qualitative analysis of the selected intra-urban space – instead, certain parts and signs pertaining to the selected objects will be analysed in terms of multimodality. The complex relationships among all the signs on the investigated objects (e.g. complete front façade of certain houses, inner courtyards, etc.) will not be addressed.

3 Multimodality in Banská Bystrica

3.1 Diachronous analysis

As already indicated, the recipient comes into contact with the visual reality of a linguistic landscape through the language, symbols, and objects; the visual representations can mediate the context directly or indirectly. However, this phenomenon is not new at all. Artistic elements such as statues or reliefs have always been an inseparable part of architectural styles, e.g. coats of arms and other elements characterising the property owner, or later the tenant, used to be placed on façades. In the centre of Banská Bystrica, a major change took place in the 19th century, when the first "display windows" appeared. Their appearance somehow stifled the sale of certain goods at markets and fairs, and the era of shops began. The ground level premises of the residential buildings with the windows facing the street in the city centre were adapted to display goods. The "display windows" were the predecessors of today's shop windows which also display the goods, sometimes using other objects (mannequins in clothes shops, 3D compositions, etc.). It can be described as the conscious formation of a semiotic, i.e. linguistic landscape by the producers with the aim to present a product or service to the potential customers. For example, the "display window" of the Potraviny U Klimov grocery shop (Námestie SNP Square 9) – one of the oldest preserved shops in the Banská Bystrica city centre. In the era of Austria-Hungary, the Móry family operated a general store on the ground floor of their house entitled "Móry János" (Baláz, 2008, pp. 78-80). Around 1922, the Klimo brothers took over the shop and renamed it to "Móry nástupca bratia Klimo" ("Móry – successor: Klimo brothers", Fig. 1). The Banská Bystrica citizens kept referring to the grocery shop as (U Klimov, do Klimov = Klimov's) even when the shop sign ("U Klimov") had been removed.³



Figure 1 Display windows in 1913.

From the diachronous point of view, the Červený Rak (Red Crayfish) restaurant at Námestie SNP 13 is important in this study. From the 1590s, it was owned by Juraj Krebs, a member of the external city council. The name of the restaurant derives from his name, which translates as "crayfish"; for more than 300 years, the restaurant has retained the name and was referred to as Rak (Crayfish), U raka (Crayfish's), U červeného raka (Ger. zum Roten Krebs = Red Crayfish's). A mention from 1786 refers to a large sheet metal crayfish decorating the front façade of the house (Baláz, 2008, p. 116). As can be seen in this historical example, the linguistic landscape of Banská Bystrica includes not only the texts placed on the façades of the houses – the multimodal combinations of language and image had an equal status, e.g. the written sign "Hotel Rak" and a crayfish sculpture. However, the information represented by the image is vaguer than the text.



Figure 2 Hotel Rak with the metal sheet crayfish sculpture in 1928.

Today, the red crayfish sculpture accompanies the name of the restaurant again, placed on the front façade of the house. However, the main text (name of the facility) and the respective image have the same status. They contain double information (direct repetition): the written text (Červený Rak) is repeated in the form of the image depicting a red crayfish sculpture, i.e. using another semiotic system. Additional information can be found under the name of the facility, however, the writing is smaller, therefore the recipient perceives and deciphers it only after they notice the sculpture and main text. Interestingly, red has been used. Conventionally, red is used as a "signalling" colour to attract attention (e.g. discounts in shops) or warn about danger (prohibitive road signs), or to express emotions (e.g. love). In this case, only the crayfish sculpture is red while the text is not, therefore the folklore historical context could have played a role. In Slovak, the simile "červený ako rak" ("red as a crayfish") derives from the fact that a crayfish turns red when it is boiled; in the past, crayfish were abundant in Slovak streams and restaurants often offered this meal.



Figure 3 The name of the restaurant and the crayfish sculpture today

The brief diachronous insight into the LL multimodality of the Banská Bystrica city centre ends with the analysis of this photograph. The deli is located at Námestie SNP Square 3 in

² Currently, the only study of a linguistic landscape focused on complete documentation of the both qualitative and quantitative analysis of multimodal units in the semiotic landscape of the public space known to the author is I. Schulze's *Bilder-Schilder-Sprache. Empirische Studien zur Text-Bild-Semiotik im öffentlichen Raum*. Tübingen: Narr Francke Attempto Verlag, 2019. 227 p. ISBN 978-3-8233-8298-0.

³ During the period of socialism, all shops in the Banská Bystrica city centre were uniformly named POTRAVINY (GROCERY SHOP) and due to pragmatic reasons, the citizens used additional names to distinguish between them. In this case, the historical context has been retained and the original name of the shop restored.

approx. 1932⁴ (Baláz, 2008, p. 29). In Fig. 4, a combination of different semiotic systems can be seen. Their goal is to attract the potential customer's attention. The information about the facility is mediated using both linguistic and non-linguistic signs. The owner's name is placed on the façade above the shop windows and entrance in accordance with the contemporary conventions (sign type: shop sign). The text is written in a distinct, large sans-serif typeface. The font size and its location allow for quick perception immediately after the recipient notices the visual elements. Additional written information about the facility type is located in three different places, therefore it seems that the producer considered them important. The recipients perceive the information when they approach the shop from different directions, since the sign is mounted on the wall as well as on a wall bracket perpendicular to the façade (sign type: wall bracket). The goods are presented using a combination of linguistic and non-linguistic signs, specifically the goods are displayed in the shop window together with an advertising poster.



Figure 4 Bodega – Pavel Tóth's deli (around 1932)

3.2 Synchronous analysis

In this part of the paper, the specific examples of multimodality in the current linguistic landscape of the Horná Street in Banská Bystrica will be addressed. It focuses on the signs that combine text and image/graphic elements and the sign types themselves vary. All the analysed signs (8) and their photographs are a part of the APVV project database. The categorisation of the multimodal data⁵ and terminology stabilised based on the existing theoretical sources and pilot research will be used.

All these research objects belong to the branch of trade, service, and partially also culture and gastronomy. Specifically, they include a grocery shop, cosmetics shop, jazz club with a restaurant, bar, music shop, textile shop, clothing rental, and lawyer's office. In terms of sign authorship, the objects are commercial, therefore the discourse can be characterised as unofficial (bottom-up). In terms of the sign type, it can be a plate, shop sign, wall bracket, or a poster. In terms of the sign shape, rectangles and squares prevailed, although ovals and real object shapes (e.g. guitar, mannequins in the shop window, etc.) were also identified. In terms of multimodality, mainly communication and logos were found. Communication is defined as a combination of text with an image/graphic element, which includes objects such as mannequins and decoration. Logo is defined as a graphic representation of the name of an organisation, company, or institution combined with a visual element.

The first example is the Talianske Potraviny (Italian grocery shop, Fig. 5). The name is written on a rectangular plate placed on the façade of the house No. 16 along with seven other plates.

⁶ All these plates fulfil the identification function in the public space; usually, the contents are stereotypical (name of the facility, company, brand, etc.). In terms of attracting the recipient's attention (marketing goal of the sign producer, bottom-up perception process promotion), it is important for the plate to differ from the other plates. The placement of the plate is deliberate – it is at the top and is one of the larger plates. The linguistic signs are limited to a minimum and the information is condensed to the essence, while the visual and emotional stimuli take the form of colours contrasting with the building façade (stylised Italian flag) and typeface (large, distinct letters with serif typeface).



Figure 5

On the façade of the house No. 16, there is also a table saying "RYOR" (Fig. 6). It is rectangular, but half the size of the Italian grocery shop plate, and it is located to the left from the centre, which should be a less advantageous placement in comparison with other plates in terms of perception. It fulfils the identification function; the name refers to a Czech brand of cosmetics. Again, the linguistic signs are limited to a minimum and condensed to the point when it is vague for the recipient as it lacks information about the type of facility. The visual stimulus and the bottom-up perception process are supported by the use of green contrasting with the font and the building façade at the same time. The letter Y is stylised. Further contextual knowledge is necessary for more thorough perception. Ryor is a Czech brand of natural cosmetics. It is an acronym consisting of Czech "rybíz" ("currant") and English "orange". The green colour and replacement of a part of the letter Y with a leaf picture refer to nature and pure natural products.



Figure 6

Rectangular plates are typical for lawyers' offices on Horná Street in Banská Bystrica. In most cases, the plates use a single language, they are saturated with text and lack graphic elements; they are usually silver, grey, or golden. The text is neutral, it contains the essential information about the service provided and the name(s) of the providers. Often, the floor on which the office is located is specified. This paper analyses a lawyer's office plate, which deviates from the uniform presentation usually opted for by lawyers (Fig. 7). The main information on the plate is presented in three languages (Slovak, English, and German). The text "Váš právny expert" ("Your law expert") fulfils an appellative function and addresses the potential percipient in a more personal way. This lawyer's office plate includes graphic elements: a circle and the section sign (§), i.e. a symbol used by the legal system. Multimodal elements include the red colour used for the letter L (referring to English "law") and the section sign "growing" from this letter.

⁴ The Slovak cultural identity has been significantly marked by the Czechoslovak era. The First Republic was characterised by extraordinarily rich culture, economic boom, and the increase in the commercial activity in the regions as well as many Slovak towns and cities including Banská Bystrica (Rošteková, 2020). The Slovak cultural identity further developed throughout the Soviet era, and after the fall of the regime in 1989, the key role was overtaken by Europeanisation. (Rošteková, Rouet, 2013; Ušiak, 2010)

⁵ I. Schulze: Codebook. 2020. [online] available at <https://www.ff.umb.sk/katedry/katedra-germanistiky/apvv-18-0115-jazyk-v-meste-dokumentovanie-multimodalnej-semiosfery-jazykovej-krajiny-na-slovensku-a-z-komparativnej-perspektivy-10475/manualy-leitfaden-manuals.html>

⁶ Since a large number of facilities in the Banská Bystrica city centre are located in the inner courtyards of the buildings, this is a frequently occurring sign type, shape, and location.



Figure 7

A multimodal combination of text and image in the creation of bottom-up signs can be observed in the following example as well (Fig. 8).



Figure 8

In terms of the sign type, it is a plate, however in terms of multimodal elements, it resembles a poster. This communication combines text informing about the facility type (rental of social and carnival clothing), name of the facility (Lady Mell), and its location (in the courtyard). The first visual and emotional stimuli for the percipient are provided by a colourful image depicting two figures in genre clothing (with dominant red colour), which distinguishes the plate from other plates placed on the façade of the house No. 37.

Another frequently occurring sign type at the Horná Street is the wall bracket. Three examples will be analysed. Each of the three wall brackets take different shapes and combine linguistic signs with graphic elements. In the first case (Fig. 9), the wall bracket is shaped like a guitar referring to the fact that this kind of musical instruments is sold in the shop. The mounting of the wall bracket is supposed to look like a guitar strap and the offset from the building façade increases its visibility. Figures 10 and 11 show another form of combining text and image. In terms of multimodality, the first figure shows a logo with double information provided by the text and repeated by the image. The second figure shows a wall bracket employing multiple types of modality. The font simulates handwriting, which can evoke a relaxed artistic atmosphere related to the music genre presented in the club as well as a get-together with French wine; the producer of the sign indicates that the customers are perceived as guests. The non-linguistic signs include a stylised French flag as a background for the text U FRANCÚZA (FRENCHMAN'S) and a sketch of a person holding the flag; the colours are harmonised.



Figure 9



Figure 10



Figure 11

5 Conclusion

The paper provided a partial qualitative analysis of the language landscape in the public intra-urban space of Banská Bystrica focused on the multimodality of the researched objects from the diachronous and synchronous perspectives. The analysis drew from the project hypothesis based on which the intra-urban linguistic landscape represents a semiotic world. It is characterised by a high level of multimodality comprising both the traditional and creative aspects focused on by the individual sign producers in terms of public communication. The analysis used the project categorisation of multimodal data and the stabilised terminology, i.e. the synthesis of the current verified theoretical starting points and existing pilot research. The focus was on the multimodality of the selected parts of the objects and their individual signs. Although the study did not focus on the complex relationships among all the signs on the observed objects, the hypothesis can be considered confirmed.

In further research, the author would like to focus on the complexity of the relationships among the individual signs, and by extension, the creation⁷ and perception of the multimodal objects and their meaning within the semiotic aggregate (compare Scollon – Scollon, 2003). It incorporates a broader range of semiotic units (sign, icon, graph, image, mounting of the sign board, architecture, etc.) and the variety of text-image relations.

Literature:

1. Baláž, J.: *Domy starej Banskej Bystrice I*. Banská Bystrica: BBB, 2008. 277 p. ISBN 978-80-970012-8-5.
2. Bateman, J. A.: *Multimodality and Genre. A Foundation for the Systematic Analysis of Multimodal Documents*. Basingstoke: Palgrave Macmillan, 2008. 312 p. ISBN 978-0-230-58232-3. doi.org/10.1057/9780230582323_5
3. Ďuricová, A. (Ed.): *Od textu k prekladu XIV, Part 2, Linguistic Landscape*. Praha: JTP, 2020, 88 p. ISBN 978-80-7374-128-0 (komplet), ISBN 978-80-7374-129-3 (2. časť)
4. Dobřík, Z.: Interpretácia vytvárania jazykovej krajiny Banskej Štiavnice z perspektívy sociálneho konstruktivizmu. In *Nová filologická revue*, Vol. 11, No. 2, pp. 127-138. Banská Bystrica: FF UMB, 2020. ISSN 1338-0583.
5. Gašová, Z.: Formy inojazyčnosti v jazykovej krajine. Analýza vybraných aspektov na príklade „Krčmy na Zelenej“ v Bratislave. In *Jazyk a politika. Na pomedzí lingvistiky a politológie V*. Bratislava: Ekonóm, 2020, pp. 69-82. ISBN 978-80-225-4743-7.
6. Halliday, M. A. K.: *Halliday's Introduction to Functional Grammar*. London, New York: Routledge Taylor & Francis Group, 2014. 808 p. ISBN 978-0203431269
7. Istók, V. – Tóth, S. J.: Výskum jazykovej krajiny v mestách Komárno a Komárom do r. 2019. In *Od textu k prekladu XIV, Part 2, Linguistic Landscape*. Praha: JTP, 2020, pp. 16-23. ISBN 978-80-7374-128-0 (komplet), ISBN 978-80-7374-129-3 (2. časť).
8. Jesenská, P.: Úvodné poznámky na margo výskumu jazykovej krajiny Národnej ulice v Banskej Bystrici. In *Od textu k prekladu XIV, Part 2, Linguistic Landscape*. Praha: JTP, 2020, pp. 24-28. ISBN 978-80-7374-128-0 (komplet), ISBN 978-80-7374-129-3 (2. časť).

⁷ Compare Kolečáni Lenčová, 2021, pp. 65-66

9. Jurčáková, E.: Obrazné pomenovania v jazykovej krajine Banskej Bystrice. In *Od textu k prekladu XIV, Part 2, Linguistic Landscape*. Praha: JTP, 2020, pp. 29-35. ISBN 978-80-7374-128-0 (komplet), ISBN 978-80-7374-129-3 (2. časť).
10. Kolečáni Lenčová, I.: Visual literacy v cudzojazyčnej edukácii (Visual literacy in foreign language education). In *Aplikované jazyky v univerzitnom kontexte 4*. Zvolen: Technická univerzita, 2017, pp. 16-26. ISBN 978-80-228-3002-7.
11. Kolečáni Lenčová, I.: *Linguistic landscape and reading comprehension in foreign languages teaching*. In *AD ALTA*, Vol. 10, Issue 01 (10/01), 2020, pp. 160-164. ISSN 1804-7890, ISSN 2464-6733. doi.org/10.33543/1001.
12. Kolečáni Lenčová, I.: Jazyková krajina a jej didaktický potenciál vo vyučovaní cudzích jazykov In *Humanitné a spoločenské vedy v pregraduálnom vzdelávaní*. Bratislava: Z-F Lingua, pp. 62-73. ISBN 978-80-8177-084-5.
13. Kress, G. – Leeuwen, T.: *Reading Images. The Grammar of Visual Design*. London, New York: Taylor & Francis e-Library, 2006. 321 p. ISBN 13 978-0-203-61972-8 doi.org/10.4324/9780203619728
14. Kroebel-Riel, W.: *Bildkommunikation. Imagery-Strategien für die Werbung*. München: Vahlen, 1993. 361 p. ISBN 978-3-8006-1702-9
15. Krško, J.: Lokálne nárečie ako nástroj expresivizácie v jazykovej krajine. (Na príklade Banskej Bystrice). In *Od textu k prekladu XIV, 2. časť, Linguistic Landscape*. Praha: JTP, 2020, pp. 36-46. ISBN 978-80-7374-128-0 (komplet), ISBN 978-80-7374-129-3 (2. časť).
16. Landry, R. – Bourhis, R.: Linguistic Landscape and Ethnolinguistic Vitality – An Empirical Study. In *Journal of Language and Social Psychology*. 1997, Vol. 16, No. 1, pp. 23-49. doi.org/10.1177/0261927X970161002
17. Lauková, J.: Kontext textu a obrazu vo vizuálnej semiotike jazykovej krajiny mesta Banská Bystrica. In *Od textu k prekladu XIV, Part 2, Linguistic Landscape*. Praha: JTP, 2020, pp. 47-54. ISBN 978-80-7374-128-0 (komplet), ISBN 978-80-7374-129-3 (2. časť).
18. Lauková, J. – Molnárová, E.: Viacjazyčnosť niektorých názvov obchodov a prevádzok (zariadení) v Banskej Bystrici. In *Od textu k prekladu XIII*. Banská Bystrica: Belianum, UMB, 2020, pp. 97-111. ISBN 978-80-557-1704-3.
19. Molnárová, E.: Priezviská v logonymách. Na príklade jazykovej krajiny Banskej Bystrice. In *Od textu k prekladu XIV, Part 2, Linguistic Landscape*. Praha: JTP, 2020, pp. 60 – 66. ISBN 978-80-7374-128-0 (komplet), ISBN 978-80-7374-129-3 (2. časť).
20. Rošteková, M. – Rouet, G.: *Regards croisés sur la Slovaquie contemporaine*. Banská Bystrica: Univerzita Mateja Bela, 2013, 128 p. ISBN 978-80-557-0493-7.
21. Rošteková, M.: *Civilisation slovaque: pour les relations internationales & la diplomatie*. Banská Bystrica: Vydavateľstvo Univerzity Mateja Bela - Belianum, 2020, 116 p. ISBN 978-80-557-1724-1.
22. Schulze, I.: *Bilder – Schilder – Sprache. Empirische Studien zur Text-Bild-Semiotik im öffentlichen Raum*. Tübingen: Narr Francke Attempto Verlag, 2019. 227 p. ISBN 978-3-8233-8298-0.
23. Scollon, R. – Scollon, S. W.: *Discourses in Place: Language in the Material World*. London: Routledge, 2003. 258 p. ISBN 9780203422724. doi.org/10.4324/9780203422724
24. Stöckl, H.: Sprache-Bild-Text lesen. Bausteine zur Methodik einer Grundkompetenz. In *Bildlinguistik. Theorien-Methoden-Fallbeispiele*. Berlin: Erich Schmidt Verlag, 2011, pp. 45-70. ISBN 978-3-5031-2259-2.
25. Štefaňáková, J.: K rodovo vyváženému jazyku a jeho uplatňovaniu v súčasnej jazykovej krajine (Na príklade oznamov s aktuálnymi hygienickými opatreniami v súvislosti s pandémiou koronavírusu v Banskej Bystrici a Mníchove). In *Od textu k prekladu XIV, Part 2, Linguistic Landscape*. Praha: JTP, 2020, pp. 67-85. ISBN 978-80-7374-128-0 (komplet), ISBN 978-80-7374-129-3 (2. časť).
26. UŠIAK, J.: European political culture and European community. In *Identités, citoyennetés et démocratie: 20 ans après = Identities, citizenship and democracy: 20 years after: actes de la Conférence internationale de Charleroi 22-24/10/2010 / sous la direction de Fabienne Maron, Grzegorz Pozarlik*. Bruxelles: Bruylant, 2011, pp. 109-121. ISBN 978-2-8027-3085-9.

Primary Paper Section: A

Secondary Paper Section: AI

RELATION BETWEEN THE IMPLEMENTATION FREQUENCY OF REFLEXIVE METHODS AND SELF-EFFICACY OF LOWER SECONDARY SCHOOL TEACHERS

^aMICHAL NOVOCKÝ, ^bLENKA ROVNANOVÁ

Department of Education, Faculty of Arts, Pavol Jozef Šafárik University in Košice, Moyzsova 9, 040 01 Košice, Slovakia
Department of Pedagogy, Faculty of Education, Matej Bel University in Banská Bystrica, Ružová 13, 974 11 Banská Bystrica, Slovakia
 email: ^amichal.novocky@upjs.sk, ^blenka.rovnanova@umb.sk

Acknowledgement: This study was financially supported by the project VEGA 1/0794/19 Professional identity and quality of a university teacher in contexts of andragogical competence

Abstract: The aim of this paper is to analyse the relations between the frequency of reflexive method implementation by teachers and their self-efficacy. To find out the frequency of reflexive method implementation by teachers our own scale questionnaire was used. Its internal structure was analysed using exploratory factor analysis which showed the existence of two dimensions (traditional and non-traditional reflective methods). Reliability of dimensions was evaluated using Cronbach's alpha and the result varied between 0.71 and 0.73. To map self-efficacy of teachers, OSTES (The Ohio State Teacher Efficacy Scale) was used; and it was adapted to Slovak conditions by Gavora (2012). In this case, exploratory factor analysis demonstrated that it is appropriate to consider two dimensions (teacher efficacy in using teaching strategies and manage class). Their reliability varied between 0.84 and 0.86. 345 lower secondary school teachers – ISCED 2 participated in the research. The average length of work experience of male and female respondents (n=45) was 12.80 years (SD=10.70) and (n=300) 16.20 years (SD=9.88) respectively. Statistically significant moderate positive relation was identified between the implementation frequency of traditional reflective methods and self-efficacy of teachers in using teaching strategies. Similar relation was proved between the implementation frequency of non-traditional reflective methods and the mentioned component of self-efficacy of teachers. A weak direct dependence proved to exist between implementation frequency of both reflective method groups and self-efficacy of teachers in class management.

Keywords: professional reflection, efficacy, teacher, lower secondary school

1 Introduction

Teaching is undoubtedly one of the most difficult professions. There is a discussion about life-long profession (Pavlov et al., 2018) where teachers face crises, changes and innovation for four decades following the completion of pre-gradual preparation. The image of a teacher ensuring transmission of knowledge to pupils and developing social relationships is insufficient at present, and thus the model of the minimum efficacy becomes outdated (Kosová & Tomengová et al., 2015). Teachers deal with a series of interpersonal and intrapersonal issues which require them to be professional authorities in his/her profession (Hargreaves, 2000; Korthagen et al., 2000).

Whether teachers become experts is largely dependent on their knowledge, skills and development of their professional competences and efficacy. It is impossible, however, to ignore the significance of how they self-assess themselves and their potentials. To be more explicit, their belief in their own abilities and possibilities and opportunities to implement the same in school practice is an important factor supporting teacher's influence on their pupils. Based on ideas of Bandura (1994, 1997) who considers a man to be a proactive factor regulating its cognitive processes, actions and motivation, it is obvious that teachers can modify their performance while participating in self-confidence boosting or failing when confronted with more challenging tasks. Motivational capacity of the teacher known as self-efficacy comes to the forefront.

Researches point out that self-efficacy is a predictor having a significant impact on work performance in a wide range of tasks and duties (Stajkovic & Luthans, 1998). Teachers with better self-efficacy are more persistent in their assistance to children with special needs (Soodak & Podell, 1993) and they are more demanding when it comes to educational work and the work of pupils (Ross, 1995). Self-efficacy of teachers shows positive bonds with their personal performance, job satisfaction and determination to teach (Zee & Koomen, 2016). It also appears that teachers with higher self-efficacy in class management are less likely to experience burnout (Aloe et al., 2014).

Based on presented research outcomes it can be stated that teachers with higher self-efficacy can be expected to be more willing to make more efforts to meet their educational objectives and not to be distracted by any related limits such as conflicts with pupils and changes in existing teaching concept.

According to Mareš (2013, pp. 453 – 454), teacher's self-efficacy can be influenced by autoregulation and external intervention. With auto-regulation the assumption is followed that teachers naturally review their educational achievements and failures against their colleagues and analyse how colleagues evaluate their work. Here, however, the tendency towards distortion is usual and it is the reason why some teachers overestimate while others underestimate themselves. In an effort to reduce self-assessment mistakes it is appropriate to use self-diagnostic tools to evaluate teacher's educational procedures and their attitude towards pupils. Efficient autoregulation should lead to deeper knowledge of personal qualities and professional skills of the teacher. Most frequently, feedback is the external intervention (post-observation interviews, workshops, action research, etc.) and on the basis the feedback the misconception of an individual about their possibilities is gradually modified.

According to Gavora (2011), another aspect affecting teachers' self-efficacy and its formation is their own successful experience in teaching. Teachers' self-efficacy improves if learning performance of pupils the teacher works with is good and their educational outcomes meet expectations. On the other hand, teachers' self-efficacy can improve also through failures if these are understood as a challenge and a chance to overcome own weaknesses. Shared experience should not be underestimated as well, e.g. observing the practice of other teachers where professional model plays a strategic role. The same is material in pre-gradual preparation of future teachers (Rovňanová, 2018). Self-efficacy is largely affected also by praising in the form of an official compliment or proving teacher's strengths as one of the forms of the social support. Teacher's emotional settings should also be taken into account. The teacher with optimal emotional fitness is predisposed to overcome difficulties in educational process (Gavora, 2011).

It is evident from the above mentioned that professional reflection helps improve teacher's self-efficacy correctly. The same has been proved in longitudinal study by Korthagen and Wubbels (2011) who found out that unlike the teachers who sporadically apply professional self-reflection, the feeling of personal security is stronger in reflective teachers who are also more convinced about their efficacy.

Rahimi and Weisi (2018) found out that practical and cognitive reflection of teachers strongly predicates their self-efficacy. At the same time it was proved that teachers engage in research activities connected with practice in order to be more reflective and efficient. In their study, Runhaar et al. (2010) highlighted an interesting phenomenon of teacher's working or professional self-efficacy and their orientation to teaching objectives positively related to reflection and feedback.

Studying roles and meaning of professional reflection in physical education teachers, Jung (2012) identified four areas where reflection affected their practice: (1) they were better able to handle unexpected educational events, (2) develop their knowledge while acting, (3) they made important decisions flexibly in course of teaching, and (4) they were able to rebuild an image about their professional efficacy. The research by Genc (2010) revealed stimulating findings on professional reflection and development of teacher autonomy and their decision-making skills. Data analysis showed that teachers started to make more informed decisions on various aspects of teaching after they started writing reflective diaries.

Professional reflection is understood as a tool to improve pedagogical and didactic work of the teacher (Tugui, 2011; Tripp & Rich, 2012; Mathew et al., 2017). It allows the teacher to argue for adequacy of their teaching concept and also for discursive analysis of unconscious processes which may not be promptly covered due to educational dynamics (Korthagen, 2011). We share the view of Farrell (2007) that reflective approaches applied by teachers in teaching evaluation result in conceptualization of teaching at a higher quality level based on experience and personal beliefs.

In personal and professional development of teachers, professional reflection has not only developing function but also adaptation function which helps them to adapt to existing conditions while accepting needs of pupils; motivational function stimulating teachers to make an effort and understand applied didactics and educational processes; control function which helps determine the scope of changes demonstrated in educational work outcome; preventive function because with reflection, teachers can foresee their future reactions to problematic situations in course of educational process; relaxation function because with the analysis of successfully resolved educational events they can get impulses for further activities, and the creative function reducing stereotypical approach to pupils (Hupková, 2006; Obst, 2009; Korthagen et al., 2011; Kouteková & Furinová, 2015).

We agree with Evans (2011) that professional development of teachers should be built on development of professional reflection (behavior, attitudes, and intellectuality). The study implemented by Yost (2006) has drawn the attention to a serious phenomenon: the ability of professional reflection of beginning teachers and their efficacy supported by successful experience in teaching are more decisive factors for job success than positive school climate. It is assumed that the same may apply to more experienced teachers.

The efficacy of professional reflection depends on using reflective methods as sources of teachers self-evaluation in course of which the roles of actor and observer are integrated (Brookfield, 2017; Orosová et al., 2018a). These methods are used to obtain feedback on teacher performance in course of educational process.

Feedback affects future performance of teachers when it contains positive notes on educational activity as well as on the person who carried out such educational activity. It is desirable to detail what was good in teacher's performance and what their strengths are. It is also important that the feedback contains information on improvements that could be made. These proposals should not be understood as negative criticism but rather as an appeal for personal improvement. Feedback as one of the forms of reflection contains also issues related to further planning of activity and its change (Plamínek, 2014).

Reflective methods may be classified based on various criteria. Based on the extent to which their implementation depends on engagement of the competent people and pupils reflective methods may be interactive – these include job shadowing, reflective dialogue with a colleague, questionnaire, discussion of school teachers on educational problem and pupils opinions on the course of classes and teaching.

On the other hand, teachers also use reflective methods that require no interaction but provide possibilities to analyse their educational work. These include self-observation, pedagogical diary, self-evaluation, self-reflexive taxonomy, teacher portfolio, preparation for teaching and studying pedagogical literature.

Reflective methods can be divided also based on tradition of use. To improve their work, teachers in practice are required to prepare for classes, use self-observation and self-evaluation and related reflective dialogue with a colleague about educational issues. As an option, they may also use reflective methods which are beyond their duties if they are interested in professional development (pedagogical diary, teacher portfolio, studying

pedagogical literature or analysis of pupils' opinions on the course of classes in the form of a dialogue at the end of the class).

Based on the background above four research hypotheses were formulated:

- H1: *We assume there is a statistically significant positive relation between the implementation frequency of traditional reflective methods by teachers and their self-efficacy in using teaching strategies.*
- H2: *We assume there is a statistically significant positive relation between the implementation frequency of traditional reflective methods by teachers and their self-efficacy in class management.*
- H3: *We assume there is a statistically significant positive relation between the implementation frequency of non-traditional reflective methods by teachers and their self-efficacy in using teaching strategies.*
- H4: *We assume there is a statistically significant positive relation between the implementation frequency of non-traditional reflective methods by teachers and their self-efficacy in class management.*

2 Characteristics of the research sample

Respondents in a research set were obtained by means of available selection because our possibilities to make selection allowing better research outcome generalization were limited. On-line questionnaire was used as the most suitable to meet our purpose because the research was carried out among teachers of the lower secondary schools in all Slovak regions. Respondents were addressed via school e-mail addresses available on the website of the Slovak Centre for Scientific and Technical Information.

The data were collected between January and March 2017. 372 teachers participated in the research but beginning teachers and teachers with short work experience (about 1 year) were removed from the database as they could probably respond inadequately to most of items and this could distort research outcomes (N=345).

Majority of the research set consisted of female respondents (n=300; 86.96%). Respondents who obtained teaching qualification studying teaching programme at universities (n=260; 75.36%) made up almost three quarters of the research set. The number of respondents who completed training aimed at reflective teaching within last 8 years was lower (n=99; 28.70%). A significant part of participants (n=271; 78.55%) responded positively to a question whether they were interested in participating in such training. Respondents from eight-year grammar schools showed little interest (n=26; 7.54%) in participating in the research compared to respondents at primary schools. Specification of respondent's answers with respect to the year and school subject as specified in methodology part could be the reason. Average work experience of respondents is 15.76 years (SD=10.04). The research set divided by the duration of the work experience of the respondents and the region where the school of pedagogical activity is located are shown in Table 1 and Table 2.

Table 1: Representation of respondents in the research set by duration of work experience

<i>Duration of work experience in completed years</i>	n	%
1.5 – 5	65	18.84
6 – 10	67	19.42
11 – 15	58	16.81
16 – 20	56	16.23
21 – 25	33	9.57
26 – 30	33	9.57
31 and more	33	9.57
Total	345	100

Table 2: Representation of respondents in the research set by region

Region	n	%
Bratislava	42	12.17
Trnava	11	3.19
Trenčín	57	16.52
Nitra	24	6.96
Žilina	42	12.17
Banská Bystrica	48	13.91
Prešov	55	15.94
Košice	66	19.13
Total	345	100

3 Research methodology

Revalidated version of the adapted Ohio State Teacher Efficacy Scale (OSTES) (scale questionnaire) was used to identify the level of teacher's efficacy (Gavora, 2012). The questionnaire comprised 15 items formulated as questions the respondents were supposed to answer using 9-point scale. For purposes of our research, the extent of the scale was reduced to 5 levels (nothing – a few – a little – quite – a lot), because the questionnaire was filled in by teachers of lower secondary schools teaching at least one of their subjects to 7th grade pupils. They responded to issues related to the selected subject (taught the first in a week) and the grade of pupils which was relatively difficult because teachers were limited by this specification (they had to think more in case of alternatives). At the same time, the following item was modified: What are you able to do with very problematic pupils?; our idea of this type of pupils (pupils with learning disabilities) was added in brackets.

Pre-research on a sample of 162 Slovak teachers resulted in a selection of one grade that respondents would focus their answers on. In addition to the proposal of respondents that the questionnaire should include other variables, our attention was drawn to the fact that difficulties might be expected in generalization of research outcomes because the research took place in all regions. This was solved by specification of the research sample. 7th grade of the lower secondary school was preferred above all other. Our decision is based on the following reasons: (1) These teachers had known given (7th grade) pupils for a longer period of time (they worked with them in previous grades of the primary school or eight-year grammar school); (2) Following the sample specification we obtained as high number of respondents as possible. Comparing the number of 7th, 8th, and 9th grade pupils at schools as of September 2016, the number of 7th grade pupils was higher ($n=40,673$; 8th grade – $n=38,490$, 9th grade – $n=35,126$). Based on this fact a conclusion was drawn that the number of teachers teaching at 7th grade must have been higher than the number of teachers teaching older pupils. The numbers of pupils were obtained from the Statistical Yearbook of Education (www.cvti.sk).

To understand the structure of the research tool the exploratory factor analysis was used based on working with the fixed number of factors (2). Exploratory factor analysis was preferred over confirmational one due to the modification of the questionnaire mentioned above and the research sample was quite specific (see Table 3). As the research by Gavora (2012) and other experts dealing with the issue of teacher's self-efficacy proved, dimensions of the OSTES questionnaire are highly correlated among each other (Hamman et al., 2006; Martin & Sass, 2010), thus the method of the principal components with promax oblique rotation, was applied assuming that factors will not be independent of each other (Tabachnick & Fidell, 2018; Rabušic et al., 2019). The value of the total used variability of the variables following their rotation could not be determined due to factor correlation.

KMO test for selection adequacy ratio (0.891) confirms that factor analysis is appropriate for data obtained and Bartlett's test of sphericity refutes the hypothesis that the correlation matrix is an identity matrix ($0.000 < 0.001$). Minimum factor loading for the item to be included in one the factors was 0.40. Factor

loading of the item could not be higher than 0.40 in two or more factors at the same time. In course of the exploratory factor analysis, 3 items with low communality value ($< 0,30$) (*What are you able to do to teach your pupils critical thinking?*, *What are you able to do when your pupils ask difficult questions?*, *What are you able to do with very problematic pupils – pupils with learning disabilities?*) were excluded.

The factor of efficacy in teaching strategies consisted of items related to methodological management of the class by the teacher. The value of Cronbach's alpha for this dimension was 0.835, and this slightly differs from the value of reliability in Slovak version of OSTES for this dimension (0.87). The reason is in the fact that two items were eliminated from the said dimension. The factor of efficacy in class management consisted of items related to class management by the teacher in terms of discipline. The value of Cronbach's alpha for this dimension was 0.856. It can be stated that the factor analysis proved it was appropriate to consider two factors as in case of the factor analysis outcome by Gavora (2012). The value of Cronbach's alpha for the entire research tool was 0.882.

Based on the value of Spearman's rank correlation coefficient it can be said that there is a strong correlation between dimensions ($p < 0.001$; $r_s=0.558$). Although these dimensions reflect two aspects of the self-efficacy in teaching, they are closely interconnected because successful usage of teaching strategies is often determined by how the teacher is able to regulate the discipline of pupils in their class. This would correspond with the statement by Kohútová (2018) resulting from Tschannen-Moran and Woolfolk Hoy, as well as Gavora, that unidimensional research tool may also be considered.

The scale questionnaire we designed was used to map the implementation frequency of reflective methods by teachers. The items comprised respective methods and the respondents had to choose the frequency of their usage on a 7-point scale (every day – 2x per week and more – once a week – once a fortnight – once a month – once every three months – never). As with items of the first research tool, respondents had to relate their answers to the selected subject and seventh grade. This caused that the initial values had to be re-coded in order to avoid discrimination of respondents who teach given subject to seventh grade pupils for a shorter period of time. Table 4 contains correction of scale levels made in connection with the number of days given subject is taught by teachers of seventh grade pupils. This step has been consulted with the methodologist and statistician in advance.

In order to capture the structure of the research tool, exploratory factor analysis was conducted as in the previous case (see Table 5). The method of principal components with equamax orthogonal rotation proved to be most appropriate with the proved standard exhausted variability of variables (55.79%). KMO test for selection adequacy ratio (0.782) confirms that factor analysis is appropriate for data obtained and Bartlett's test of sphericity refutes the hypothesis that the correlation matrix is an identity matrix ($0.000 < 0.001$). Minimum factor loading for the item to be included in one the factors was 0.40. Factor loading of the item could not be higher than 0.40 in two or more factors at the same time. In the course of exploratory factor analysis, 1 item was excluded with the factor loading higher than 0.40 in two factors at the same time (professional standard).

Traditional reflective methods should be the methods that have a stable place in the work of teachers. Using these methods respective educational elements are reviewed and revised. The work of teachers would practically remain unimproved without these methods. The value of Cronbach's alpha for this dimension was 0.731. Non-traditional reflective methods are the methods that do not necessarily need to be used by teachers in their educational practice but can help them develop professionally and mentally. These methods are time consuming and difficult in terms of the ability of the targeted self-observance which the teacher keeps using. The value of Cronbach's alpha for this dimension was 0.708. The value of Cronbach's alpha for the entire research tool was 0.760.

Table 3: Components of perceived teacher's self-efficacy (Rotated matrix of factor loadings)

Factor-feeding items	Factors		
	α	I	II
(I) Efficacy in using teaching strategies	0.835		
What are you able to do to develop creativity of your pupils?		0.836	-0.137
What are you able to do to use diversified methods to review and test pupils' knowledge and skills?		0.747	-0.045
What are you able to do for your pupils to better understand the content of learning?		0.711	0.011
What are you able to do to introduce innovation into your teaching?		0.666	-0.015
What are you able to do to formulate adequate questions for your pupils?		0.635	0.070
What are you able to do for routine activities to run smoothly during classes?		0.616	-0.012
What are you able to do to support development of talented pupils?		0.548	0.207
What are you able to do if pupils do not understand the content of learning at all?		0.438	0.361
(II) Efficacy in class management	0.856		
What are you able to do against cheeky pupils?		-0.081	0.896
What are you able to do to eliminate individual pupils who are able to disrupt the class?		-0.003	0.833
What are you able to do to manage pupils disturbing others?		0.047	0.827
What are you able to do to prevent pupils from disturbing others?		-0.035	0.814
<i>eigenvalue</i>		4.57	4.26

Table 4: Scale level correction

Number of days of teaching/ example of the subject		5 days (e.g. Mathematics, Slovak language)	4 days (e.g. English language, Biology)	3 days (e.g. Geography, Physics)	2 days (e.g. History, IT)	1 day (e.g. Religious Education, Music)
Alternative change	<i>always</i>	every day	every day	every day, 2x a week and more	every day, 2x a week and more, once a week	every day, 2x a week and more, once a week
	<i>almost always</i>	2x a week and more	2x a week and more	once a week	once a fortnight	once a fortnight
	<i>often</i>	once a week	once a week	once a fortnight	once a month	once a month
	<i>from time to time</i>	once a fortnight, once a month	once a fortnight, once a month	once a month	once per three months	once per three months
	<i>never</i>	once per three months, never	once per three months, never	once per three months, never	never	never

Table 5: Components of the scale questionnaire to find out the implementation frequency of reflective methods by teachers (Rotated matrix of factor loadings)

Factor-feeding items	Factors		
	α	I	II
(I) traditional reflective methods	0.731		
self-observation		0.806	0.060
self-evaluation		0.803	0.130
reflective dialogue with a colleague		0.705	0.230
preparation to teaching		0.570	0.104
(II) non-traditional reflective methods	0.708		
teacher portfolio		0.055	0.823
pedagogical diary		0.004	0.791
studying professional pedagogical literature		0.338	0.660
pupils' opinion on the course of the class (in the form of the dialogue at the end of the class)		0.366	0.521
<i>eigenvalue</i>		2.37	2.10
<i>% of dispersion</i>		29.60	26.19

The value of Spearman's rank correlation coefficient is a proof that there is a moderate dependence between values ($p < 0.001$; $r_s=0.379$) which, in principle, reflects our understanding of these methods where traditional reflective methods represent a stimulus to exploit non-traditional reflective methods directed towards more pregnant self-diagnosis of teachers. Thus teachers take a new perspective being the basis for changes in school practice through selecting appropriate educational tools for work with pupils.

Statistically significant differences and relations between variables were verified with the confidence level of 0.05. Non-parametric significance tests were used such as Spearman's rank correlation coefficient, Mann-Whitney U test and Kruskal-Wallis' test because variables failed to show normal distribution per the set and subsets which was verified using Kolmogorov-Smirnov and Shapiro-Wilk tests ($p < 0.05$). A median (Me) was used from descriptive statistics. The data were evaluated in SPSS 20.0 programme.

4 Research Results

Table 6 shows that there is a moderate direct dependence between the frequency of implementation of traditional reflective methods by teachers and self-efficacy in using teaching strategies. More frequent analysis of teachers' work appears to improve self-efficacy of teachers in choosing more adequate educational means meeting pupils' needs. As seen in Table 6 this statement also fits the description of the relation between the implementation frequency of non-traditional reflective methods and the component of the professional self-efficacy. Moreover, Table 6 shows that there is a weak direct dependence between the implementation frequency of traditional reflective methods and self-efficacy in class management. The same is true for the relation between the implementation frequency of non-traditional reflective methods and the mentioned component of professional self-efficacy. The correlations show that more frequent analysis of teacher's educational activity is not a factor that would significantly affect how teachers believe in themselves when dealing with behavioural problems of pupils in their class.

Table 6: Relation between the implementation frequency of reflective methods and self-efficacy of teachers

Relation between reflexive methods and components of professional self-efficacy		Efficacy in using teaching strategies	Efficacy in class management
Traditional reflective methods	<i>Spearman's Rho</i>	0.332	0.211
	<i>p-value</i>	0.000*	0.000*
	<i>N</i>	345	345
Non-traditional reflective methods	<i>Spearman's Rho</i>	0.348	0.186
	<i>p-value</i>	0.000*	0.001*
	<i>N</i>	345	345

5 Discussion

Teachers as representatives of a helping profession are expected to develop permanently and keep themselves professionally ready and only then they are able to actively respond to changing situation in the society. Professional reflection is one of principal tools used to update expert knowledge and skills of teachers (Farrell, 2015; Hall & Simeral, 2015; Bolton & Delderfield, 2018).

European ideas for better learning (2018) by the European Commission deals with the need for professional learning of teachers in more details and highlights the importance of reflexive practice playing a role in professional improvement of teachers. We agree with Kosova (2012), Kasacova (2013), Rovnanova (2013), Rovnanova and Nemcova (2017), Orosova et al. (2018b) that this practice gives teachers a chance to look at educational activity through theory and create new capabilities.

In their research, Korkko et al. (2016) proved that supporting reflexive skills of teaching students can have a positive impact on their development because professional reflection and feedback from dealing with educational situations help creating practical theories. Based on their research, Urzua and Vasquez (2008) argue that developing reflective competence that would participate in educational process improvement should start already with beginning teachers in the form of mentoring which creates the space for discursive analysis of pedagogical and didactic procedures. The findings of Postholm (2008) prove the fact that by questioning their practice teachers can go beyond the framework of their teaching and apply new perspective on educational phenomena.

Professional reflection participates in autoregulation of personality. Zibrinyiova (2014) presents studies according to which autoregulation helps focus on long-term objectives and Lovaš (2011) looks at autoregulation in terms of internalization of standards following and observation of which is independent of external control. Thematic analysis of carrier competence concept by Hašková and Vaculík (2016) revealed that introspection and positive self-concept are a part of professional potential development. Here, interconnection with self-efficacy of teachers described by Majerčikova and Gavora (2013) as belief in skills that ensure meeting educational tasks. The impact of self-efficacy on teacher's work is unquestionable as summarized in general overviews (Bray-Clark & Bates, 2003; Mok & Moore, 2019).

Our research identified statistically significant moderate positive relation between the implementation frequency of traditional reflective methods and self-efficacy of teachers in using teaching strategies. Moderate positive correlation was shown also between the implementation frequency of non-traditional reflective methods and self-efficacy of teachers in using teaching strategies. Weaker direct dependence was reported between implementation frequency of traditional reflective methods and self-efficacy of teachers in class management. Correlation between the implementation frequency of non-traditional reflexive methods and self-efficacy of teachers in class management was similar.

Outcomes of the research by Noormohammadi (2014) showed positive relation between the implementation frequency of practical, cognitive, meta-cognitive, critical and learner reflection and self-efficacy of teachers in using teaching strategies. Direct dependence was also confirmed between the implementation frequency of respective types of professional reflection (except for critical) and self-efficacy of teachers in class management. Moreover, Babaei and Abednia (2016) found out that meta-cognitive reflection of teachers is a predictor of self-efficacy of teachers.

We are of the opinion that a stronger direct dependence between the implementation frequency of given groups of reflective methods and self-efficacy of teachers in class management has not been proved because there is a constant pressure placed on teachers in terms of their pupils achieving better learning and educational results. This makes teachers review the teaching strategies they use and take account of educational needs of pupils. This seems to reduce the opportunities to reflect modification of the behaviour disturbing the course of teaching. However, optimum class management is the baseline for implementation of selected teaching methods and forms (Rovnanova, 2019). Salaty (In Petlak, 2004) highlights the fact that, in educational process, the teacher has the role of a manager creating conditions for pupils' work, and an integrator ensuring equivalent positions of pupils in a group.

We believe that regulation of the behaviour of pupils in course of teaching is a hotspot for teachers because they are limited in using negative motivation (e.g. threats, bans) that would force pupils to respect rules in course of tasks and activities. On the other hand, we note that it is more important to draw the attention of pupils during educational process to the extent it will not be necessary to use coercive means; this would explain the

focus on more frequent reflection of applied teaching strategies (Sámelová, 2014; Čapek, 2015; Tóthová et al., 2017).

Korthagen and Wubbels (2011), who based their ideas on works of psychologists focusing on self-efficacy, believe that professional reflection is also a threat for our self-concept because we are exposed to the evaluation of professional performance. To avoid disruption of internal integrity of personality, defensive reaction usually follows.

Possible reason behind why no stronger direct dependence between dimensions of tools was shown can be in the fact that respondents who obtained teaching competences in complementary pedagogical studies had statistically significant lower score for the dimension of self-efficacy in class management than that of respondents who studied teaching as their primary university education (Me=4.00; Me=4.25; Mann-Whitney U test=9439.500; p=0.041). The score for the dimension of self-efficacy in class management of respondents who had not completed the reflective teaching training was significantly lower than that of respondents who completed such training (Me=4.00; Me=4.25; Mann-Whitney U test=10539.500; p=0.048).

According to Tremblay et al. (In Veteška & Tureckiová, 2008), it is typical for professional competences that they are contextualized, created based on previous knowledge, experience, needs or interests of learners; multidimensional, consisting of various sources and efficient work with such sources; standard-defined, defined by a set of criteria for teacher's behaviour and activity; and they have potential for action and development which means they are obtained and deepened in course of further education and learning. This fact should not remain underestimated also in case of professional reflection. Its adequate course may not be taken for granted especially in case of intentional reflection.

Thus the respondents were also asked on what practices they use for intentional professional reflection. Most of them use oral practice in the form of an internal dialogue (n=221; 64.06%). Almost one third of respondents (n=99; 28.70%) prefer to carry out intentional professional reflection practice in writing where they put notes in their preparation or a sheet attached to the lesson preparation on what they would have changed and how. The research set also contained respondents who did not tend to use any professional reflection practices at all (n=25; 7.25%).

It can be noted that statistically significant difference was shown in implementation frequency of traditional (Kruskal-Wallis H test=9.713; p=0.008) and non-traditional (Kruskal-Wallis H test=12.588; p=0.002) reflective methods in terms of the form in which intentional professional reflection practices are carried out by teachers. Respondents who carry out oral and writing intentional professional reflection practices had a higher score for implementation frequency of traditional (Me=4.50; Me=4.50) and non-traditional (Me=2.75; Me=3.25) reflective methods than the respondents who carry out no professional reflection practices (Me=3.75; Me=2.25). Statistically significant difference in the score for the dimension of the professional efficacy in using teaching strategies and class management was not proved in terms of the discussed variable.

According to Jay and Johnson (2002), the practice of reflection consists of these three steps: description, comparison and criticism. It is questionable whether the last stage is carried out where the teacher processes new information and evaluates alternatives for purposes of educational element modification. In similar researches, it would be desirable to work with a control variable indicating the level of reflection of teachers. Findings by Greene (2017) in the field of social care indicated that the role of reflection seems to be an ideological concept. Research participants considered reflection to be a professional skill but they failed to use it regularly in practice. Statistically significant difference was identified in frequency of use of non-traditional reflective methods by teachers in terms of their interest in participating in reflective teaching training.

Respondents who were interested in participation in such training had a higher score in frequency of use of non-traditional reflective methods than those who would not participate in such training (Me=3.00; Me=2.50; Mann-Whitney U test=7460.500; p=0.001).

As for the independent variable of sex, female respondents had statistically significant higher score in frequency of use of traditional reflective methods than male respondents (Me=4.50; Me=3.75; Mann-Whitney U test=5187.500; p=0.012). Čerešník (2011) who analysed the research of Marusic aimed at finding correlation between masculinity, femininity and items of personality questionnaire pointed out that altruism, modesty and kindness may be included to feminine characteristics in addition to aesthetic sense, confidence, and fairness. We consider these attributes to be the platform for correct professional reflection that takes account of weaknesses in educational activities as well.

The total score of respondents for the implementation frequency of traditional reflective methods regardless the independent variable indicates that respondents use these methods almost always (Me=4.25) while global score for the implementation frequency of non-traditional reflective methods indicates that respondents often use these types of methods (Me=3.00). As for especially the second group of methods, the claim by Lucas (1996) that courage should be included in attributes of the reflective practice.

By means of qualitative research, Feranská (2019) wanted to find out factors that affect self-efficacy of teachers. Analysing data from talking to teachers she created four material determinants participating in improvement of their educational activity. These are teacher's personality, his experience, working with pupils and stress or frustration management. These factors are considered to be equivalent.

We are of the opinion that experience of teachers in respective areas is more or less decisive because, as the author claims, it enables teachers to make their work precise and better consider needs of pupils. On the other hand, more experienced teachers are also more exhausted in their profession and they use routine teaching techniques and proven educational means while beginning teachers are full of enthusiasm and more passionate. The truth is that dealing with a shock of school reality common for beginners is not an easy thing.

The number of respondents with longer work experience in the research set was naturally higher (from 11 to 15 years to 31 and more years) representing 61.74% (n=213); despite this fact we were able to cover only a trivial statistically significant positive relation between the duration of work experience of respondents and their self-efficacy in using teaching strategies ($r_s=0.148$; p=0.006).

Summarizing the findings of experts dealing with professional efficacy of teachers, Gavora (2008) claims that self-efficacy is situation-specific, changes depending on the level of school, school subjects and various educational situations.

Our research set was unique because respondents had to respond to questionnaire items related to selected subject and grade. Certain ontogenetic specifics are connected with seventh grade pupils. It is the period of adolescence where abstract, meta-cognitive and divergent thinking starts but also mood changing and inadequate expression of emotions. The teacher is considered to be an authority by pupils of this age when they are able to attract the attention of pupils (Oravcová, 2010; Vágnerová, 2012; Rovňanová & Šukolová, 2019). As for the school subject, the number of teachers teaching languages (Slovak, English languages, etc.), Mathematics and Sciences was significantly higher in the research set. The content of these subjects is more difficult in terms of mental processes of pupils.

6 Conclusion

Based on the presented research outcomes we would argue that there is a connection between the components of frequency concepts of reflexive methods implemented by teachers and their self-efficacy. The proved positive relation between both components of the implementation frequency of reflexive methods and professional efficacy of teachers in using teaching strategies is especially noteworthy. Although it is not relatively strong direct dependence which could be used as the basis for addressing more pregnant recommendations to lower secondary school teachers and their practice, we believe that strengthening the model of reflective teaching where teachers obtain new knowledge and actively participate in developing their professional skills (not only) through theory-based interpretation of educational situations, should be permanently present in teachers' practice. Ultimately, the same may be proved also on the level of the self-efficacy of teachers in working with the content taught in terms of needs and opportunities of pupils.

It is questionable, however, whether it is appropriate to talk about implementation frequency of professional reflection when mapping the implementation frequency of reflective methods. Although teachers use reflective methods, it is not a rule that they plan quality improvement of their work intentionally and deliberately. The reality is that covering implementation of professional reflection is quite complicated because it is a hidden process inside the personality. Although scale questionnaires are used with items containing statements on the frequency of considering or thinking about certain aspects of teaching, it can be doubted whether they reflect purposeful decision-making of teachers and making fact-based decisions in course of teaching.

We follow the understanding of reflective teaching by Kasáčová (2014, p. 9) who considers it to be a "complex of teacher's activities that reflect teacher's thinking, activities and opinions in course of preparation, implementation and evaluation of educational process in perspective of the content, social and institutional educational situation on the basis of their professional, ethical and personal self-awareness."

Distortion should also be taken into account in case of teachers' self-assessment related to the extent to which they are able to use selected activities with pupils during educational process. When one is exposed to the self-assessment, they tend to see themselves in better light compared to reality.

The use of available selection of respondents limited by several aspects seems to be a problem, too. One of them is that research outcomes cannot be generalized to Slovak teachers teaching seventh grade pupils at lower secondary schools in a valid way. As it is very difficult to motivate teachers as respondents to fill in questionnaires, and this makes random selection more complicated, it would be adequate for further researches to take place in selected regions or larger districts. Thus research outcomes would have more appropriate generalization potential.

Literature:

1. Aloe, A. M. et al. Classroom Management Self-Efficacy and Burnout: A Multivariate Meta-Analysis. *Educational Psychology Review* [online]. 2014, 26(1), 101–126 [cit. 2019-12-01]. ISSN 1573-336X. Available: <http://dx.doi.org/10.1007/s10648-013-9244-0>
2. Babaei, M., Abednia, A. Reflective Teaching And Self-Efficacy Beliefs: Exploring Relationships In The Context Of Teaching EFL In Iran. *Australian Journal of Teacher Education* [online]. 2016, 41(9), 1–26 [cit. 2019-12-22]. ISSN 1835-517X. Available: <http://dx.doi.org/10.14221/ajte.2016v41n9.1>
3. Bandura, A. Self-efficacy. In: *Encyclopedia of human behavior* (Vol. 4). New York: Academic Press, 1994. pp. 71–81.
4. Bandura, A. *Self-Efficacy: The Exercise of Control*. New York: W. H. Freeman, 1997. 604 p. ISBN 978-0-7167-2850-4.
5. Bolton, G., Delderfield, R. *Reflective Practice: Writing and Professional Development*. 5th ed. London: SAGE Publications Ltd., 2018. 296 p. ISBN 978-1-5264-1170-9.

6. Bray-Clark, N., Bates, R. Self-Efficacy Beliefs and Teacher Effectiveness: Implications for Professional Development. *The Professional Educator* [online]. 2003, 26(1), 13–22 [cit. 2019-12-23]. ISSN 2162-6618. Available: <https://pdfs.semanticscholar.org/7aa7/ba878563c23a9b0c44965b11c1814e0a5fdb.pdf>
7. Brookfield, S. D. *Becoming a Critically Reflective Teacher*. 2nd ed. San Francisco, CA: Jossey Bass Publishers, 2017. 304 p. ISBN 978-1-119-04970-8.
8. Čapek, R. *Moderní didaktika: lexikon výukových a hodnoticích metod*. Praha: Grada, 2015. 624 p. ISBN 978-80-247-3450-7.
9. Centrum vedecko-technických informácií SR. Podpora vedy, výskumu, vývoja, inovácií a vzdelávania. *Štatistická ročenka – základné školy 2016/2017* [online]. Bratislava: CVTI SR, 2020 [cit. 2020-03-28]. Available: https://www.cvtisr.sk/cv-ti-sr-vedecka-kniznica/informacie-o-skolstve/statistiky/statistic-ka-rocenka-publikacia/statistica-rocenka-zakladne-skoly.html?page_id=9601
10. Čerešník, M. *O mužoch a o ženách. Psychologický pohľad na problematiku rodu*. Nitra: PF UKF, 2011. 122 p. ISBN 978-80-8094-874-0.
11. European Commission. *European ideas for better learning: the governance of school education systems. The final report and thematic outputs of the ET2020 Working Groups Schools (2016 – 2018)* [online]. Brussels: ET 2020 Working Group Schools, 2018 [cit. 2020-03-10]. 260 p. Available: <https://www.schooleducationgateway.eu/downloads/Governance/2018-wgs6-Full-Final-Output.pdf>
12. Evans, L. The 'shape' of teacher professionalism in England: Professional standards, performance management, professional development and the changes proposed in the 2010 White Paper. *British Educational Research Journal* [online]. 2011, 37(5), 851–870 [cit. 2019-12-22]. ISSN 1469-3518. Available: <https://doi.org/10.1080/01411926.2011.607231>
13. Farrell, T. *Promoting teacher reflection in second language education: A framework for TESOL Professionals*. New York, NY: Routledge, 2015. 154 p. ISBN 978-1-138-02504-2.
14. Farrell, T. *Reflective Language Teaching: From Research to Practice*. New York: Continuum, 2007. 202 p. ISBN 978-0-8264-9658-4.
15. Feranská, M. Učiteľovo vnímanie svojej profesijnej zdatnosti. In: *Inovatívne trendy v odborových didaktikách. Prepojenie teórie a praxe výučbových stratégií kritického a tvorivého myslenia. Zborník štúdií z medzinárodnej vedeckej konferencie* [online]. Nitra: PF UKF, 2019 [cit. 2020-03-02]. pp. 134–137. ISBN 978-80-558-1408-7. Available: <https://www.pf.u.sk/images/docs/projekty/2017/pC-Cp/konferencie/2019/APVV%20Zborn%C3%ADk%202019.pdf>
16. Gavora, P. Profesijná zdatnosť vnímaná učiteľom. Adaptácia výskumného nástroja. *Pedagogická revue* [online]. 2008, 50(3-4) [cit. 2019-02-15]. ISSN 2585-8424. Available: <http://www.e-metodologia.fedu.uniba.sk/kapitoly/ziskanie-hodnotnych-dat/adaptacia-vyskumneho-nastroja.pdf>
17. Gavora, P. Skúsenosti so zisťovaním self-efficacy učiteľa pomocou dotazníka OSTES. In: *Kvalita ve vzdělávání: Sborník příspěvků z XX. výroční konference České asociace pedagogického výzkumu Praha, 10. – 12. září 2012* [online]. Praha: PF UKF, 2012 [cit. 2020-03-01]. pp. 11–18. ISBN 978-80-7290-620-8. Available: <https://pages.pdf.cuni.cz/capv2012/files/2016/02/Sbornik-CAPV-2012.pdf>
18. Gavora, P. Zisťovanie profesijnej zdatnosti učiteľa pomocou dotazníka OSTES. *Pedagogika.sk* [online]. 2011, 2(2), 88–107 [cit. 2020-02-22]. ISSN 1338-0982. Available: <http://www.casopispedagogika.sk/rocnik-2/cislo-2/Gavora.pdf>
19. Genc, Z. S. Teacher autonomy through reflective journals among teachers of English as a foreign language in Turkey. *Teacher Development: An international journal of teachers' professional development* [online]. 2010, 14(3), 397–409 [cit. 2020-03-03]. ISSN 1747-5120. Available: <https://doi.org/10.1080/13664530.2010.504028>
20. Greene, A. The Role of Self-Awareness and Reflection in Social Care Practice. *Journal of Social Care* [online]. 2017, 1(3), 1–13 [cit. 2020-03-08]. Available: <https://doi.org/10.21427/D7614X>

21. Hall, P., Simeral, A. *Teach, Reflect, Learn: Building Your Capacity for Success in the Classroom*. Alexandria, VA: ASCD Books and Publications, 2015. 177 p. ISBN 978-1-4166-2010-5.
22. Hamman, D. et al. Pedagogical influence of interaction with cooperating teachers on the efficacy beliefs of student teachers. *The Teacher Educator* [online]. 2006, 42(1), 15–29 [cit. 2020-03-15]. ISSN 1938-8101. Available: <https://doi.org/10.1080/08878730609555391>
23. Hargreaves, A. Mixed emotions: Teachers' perceptions of their interactions with students. *Teaching and Teacher Education* [online]. 2000, 16(8), 811–826 [cit. 2020-02-28]. ISSN 1879-2480. Available: [https://doi.org/10.1016/S0742-051X\(00\)00028-7](https://doi.org/10.1016/S0742-051X(00)00028-7)
24. Hašková, K., Vaculík, M. Kariérní kompetence a možnosti jejich využití v kariérovém poradenství v České republice. *Lifelong Learning – celoživotní vzdělávání* [online]. 2016, 6(3), 81–101 [cit. 2020-01-14]. ISSN 1805-8868. Available: <http://dx.doi.org/10.11118/lifele2016060381>
25. Hupková, M. *Profesijná sebareflexia učitel'ov*. Nitra: UKF PF, 2006. 203 p. ISBN 80-8094-028-2.
26. Jay, J. K., Johnson, K. L. Capturing Complexity: A Typology of Reflective Practice for Teacher Education. *Teaching and Teacher Education* [online]. 2002, 18(1), 73–85 [cit. 2020-02-14]. ISSN 1879-2480. Available: [https://doi.org/10.1016/S0742-051X\(01\)00051-8](https://doi.org/10.1016/S0742-051X(01)00051-8)
27. Jung, J. The focus, role, and meaning of experienced teachers' reflection in physical education. *Physical Education and Sport Pedagogy* [online]. 2012, 17(2), 157–175 [cit. 2020-02-02]. ISSN 1742-5786. Available: <https://doi.org/10.1080/17408989.2011.565471>
28. Kasáčová, B. Reflexívna výučba a jej kontexty. In: *Reflexia a hodnotenie v primárnom vzdelávaní*. Banská Bystrica: Belianum, 2014. pp. 9–40. ISBN 978-80-557-0788-4.
29. Kasáčová, B. Teoretické východiská diagnostiky v širších edukačných súvislostiach. In: *Pedagogická diagnostika v teórii a aplikáciách*. Banská Bystrica: Belianum, 2013. pp. 7–25. ISBN 978-80-557-0606-1.
30. Kohútová, K. Vnímaná profesijná zdatnosť učiteľa – overenie psychometrických vlastností dotazníka OSTES. *Slavonic Pedagogical Studies Journal – The scientific educational journal* [online]. 2018, 7(2), 281–292 [cit. 2020-02-09]. ISSN 1339-9055. Available: <https://doi.org/10.18355/PG.2018.7.2.5>
31. Körkkö, M. et al. Professional development through reflection in teacher education. *Teaching and Teacher Education* [online]. 2016, 55, 198–206 [cit. 2020-01-28]. ISSN 1879-2480. Available: <https://doi.org/10.1016/j.tate.2016.01.014>
32. Korthagen, F. et al. *Jak spojit praxi s teorií: didaktika realistického vzdelávaní učitelů*. Brno: Paido, 2011. 294 p. ISBN 978-80-7315-221-5.
33. Korthagen, F. et al. New learning in teacher education. In: *New Learning*. Dordrecht: Springer, 2000. pp. 243–259. ISBN 978-0-7923-6296-8.
34. Korthagen, F. Making teacher education relevant for practice: The pedagogy of realistic teacher education. *Orbis Scholae* [online]. 2011, 5(2), 31–50 [cit. 2020-01-12]. ISSN 2336-3177. Available: <https://doi.org/10.14712/23363177.2018.99>
35. Korthagen, F., Wubbels, T. Charakteristiky reflektivních učitelů. In: *Jak spojit praxi s teorií: didaktika realistického vzdelávaní učitelů*. Brno: Paido, 2011. pp. 137–150. ISBN 978-80-7315-221-5.
36. Kosová, B. Slovenské reflexie kvality štruktúrovaného učiteľského vzdelávania. In: *Kvalita ve vzdelávaní: Sborník příspěvků z XX. výroční konference České asociace pedagogického výzkumu Praha, 10. – 12. září 2012* [online]. Praha: PF UK, 2012 [cit. 2020-06-01]. pp. 150–158. ISBN 978-80-7290-620-8. Available: <https://pages.pedf.cuni.cz/capv2012/files/2016/02/Sbornik-CAPV-2012.pdf>
37. Kosová, B., Tomengová, A. et al. *Profesijná praktická príprava budúcich učitel'ov*. Banská Bystrica: Belianum, 2015. 226 p. ISBN 978-80-557-0860-7.
38. Kouteková, M., Furinová, M. *Sebareflexia a profesijné kompetencie učiteľa vo výchovno-vzdelávacom procese*. Banská Bystrica: Belianum, 2015. 136 p. ISBN 978-80-557-1068-6.
39. Lovaš, L. Aktuálne otázky výskumu sebakontroly. In: *Psychologické aspekty a kontexty sebaregulácie* [online]. Košice: UPJŠ, 2011 [cit. 2020-01-01]. pp. 7–13. ISBN 978-80-7097-933-4. Available: <https://unibook.upjs.sk/img/cms/2011/ff/Psychologicke-aspekty-a-kontexty-sebaregulacie.pdf>
40. Lucas, P. Coming to Terms with Reflection. *Teachers and Teaching: theory and practice* [online]. 1996, 2(1), 23–40 [cit. 2020-01-24]. ISSN 1470-1278. Available: <https://doi.org/10.1080/1354060960020103>
41. Majerčíková, J., Gavora, P. Vnímaná zdatnosť (self-efficacy) učiteľa spolupracovať s rodičmi: konštrukcia výskumného nástroja. *Pedagogika: časopis pro vědy o vzdělávání a výchově*. 2013, 63(2), 128–146. ISSN 2336-2189.
42. Mareš, J. *Pedagogická psychologie*. Praha: Portál, 2013. 704 p. ISBN 978-80-262-0174-8.
43. Martin, N. K., Sass, D. A. Construct validation of the Behavior and Instructional Management Scale. *Teaching and Teacher Education* [online]. 2010, 26(5), 1124–1135 [cit. 2020-01-12]. ISSN 1879-2480. Available: <https://doi.org/10.1016/j.tate.2009.12.001>
44. Mathew, P. et al. Reflective practices: a means to teacher development. *Asia Pacific Journal of Contemporary Education and Communication Technology (APJCECT)* [online]. 2017, 3(1), 126–131 [cit. 2019-12-09]. ISSN 2205-6181. Available: https://apiar.org.au/wp-content/uploads/2017/02/13_APJCECT_Feb_BRR798_EDU-126-131.pdf
45. Mok, M. M. C., Moore, P. J. Editorial: Teachers & self-efficacy. *Educational Psychology. An International Journal of Experimental Educational Psychology* [online]. 2019, 39(1), 1–3 [cit. 2019-12-12]. ISSN 1469-5820. Available: <https://doi.org/10.1080/01443410.2019.1567070>
46. Noormohammadi, S. Teacher Reflection and its Relation to Teacher Efficacy and Autonomy. *Procedia – Social and Behavioral Sciences* [online]. 2014, 98, 1380–1389 [cit. 2020-03-04]. ISSN 1877-0428. Available: <https://doi.org/10.1016/j.sbspro.2014.03.556>
47. Obst, O. Učitel ve výuce. In: *Školní didaktika*. 2nd ed. Praha: Portál, 2009. pp. 92–121. ISBN 978-80-7367-571-4.
48. Oravcová, J. *Vývinová psychológia*. Banská Bystrica: PF UMB, 2010. 232 p. ISBN 978-80-8083-937-6.
49. Orosová, R. et al. Metódy sebareflexie v praktickej profesijnej príprave učitel'ov. *Journal of Global Science* [online]. 2018a, 3(1), 1–8 [cit. 2020-03-22]. ISSN 2453-756X. Available: http://jogsc.com/pdf/2018/1/metody_sebareflexie.pdf
50. Orosová, R. et al. *Sebareflexívny pedagogický denník* [online]. Košice: UPJŠ, 2018b [cit. 2020-02-10]. 60 p. ISBN 978-80-8152-591-9. Available: <https://unibook.upjs.sk/img/cms/2018/ff/pedagogicky-dennik-final.pdf>
51. Pavlov, I. et al. *Kariérový systém profesijného rozvoja učitel'ov a model podpory profesijného učenia v škole*. Banská Bystrica: Belianum, 2018. 120 p. ISBN 978-80-557-1512-4.
52. Petlák, E. *Kompetencie učiteľa. In: Sebareflexia a kompetencie v práci učiteľa*. Bratislava: Iris, 2004. pp. 97–111. ISBN 80-89018-77-7.
53. Plamínek, J. *Vzdelávaní dospělých: průvodce pro lektory, účastníky a zadavatele*. 2nd ext. ed. Praha: Portál, 2014. 336 p. ISBN 978-80-247-4806-1.
54. Postholm, M. B. Teachers developing practice: Reflection as key activity. *Teaching and Teacher Education* [online]. 2008, 24(7), 1717–1728 [cit. 2020-04-12]. ISSN 1879-2480. Available: <https://doi.org/10.1016/j.tate.2008.02.024>
55. Rabušic, L. et al. *Statistická analýza sociálněvědních dat (prostřednictvím SPSS)*. Brno: Masarykova univerzita, 2019. 576 p. ISBN 978-80-210-9247-1.
56. Rahimi, M., Weisi, H. Reflective practice, self-efficacy and research practice of EFL teachers: Examining possible relationships. *Issues in Educational Research* [online]. 2018, 28(3), 756–780 [cit. 2020-01-03]. ISSN 1837-6290. Available: <http://www.iier.org.au/iier28/rahimi.pdf>
57. Ross, J. A. Strategies for enhancing teachers' beliefs in their effectiveness: research on a school improvement hypothesis. *Teachers College Record* [online]. 1995, 97(2), 227–251 [cit. 2020-01-13]. ISSN 1467-9620. Available: <https://www.tcrecord.org/content.asp?contentid=1423>
58. Rovňanová, L. Konceptualizácia pedagogického myslenia z perspektívy študentov a študentiek učiteľstva. In: *Vybrané aspekty pedagogickej profesie : zborník vedeckých štúdií*.

Prešov: Vydavateľstvo Prešovskej univerzity v Prešove, 2018. pp. 358–377. ISBN 978-80-555-1973-9.

59. Rovňanová, L. Subjective evaluation of demands on performance of teacher professional activities. *The New Educational Review*. 2013, 34(4), 292–304. ISSN 1732-6729.

60. Rovňanová, L. The teacher as a leader in pupil discipline management in the school environment. *Humanum : międzynarodowe Studia Społeczno-Humanistyczne* [online]. 2019, 32(1), 75–90 [cit. 2020-03-13]. ISSN 1898-8431. Available: http://www.humanum.org.pl/images/2019/HUMANUM_32_1.pdf

61. Rovňanová, L., Nemcová, L. Integration of theoretical and practical undergraduate training in the processes of developing student teachers' professional competences. *The New Educational Review*. 2017, 47(1), 176–186. ISSN 1732-6729.

62. Rovňanová, L., Šukolová, D. Kvality učiteľa z perspektívy žiakov základných škôl. *Edukácia : vedecko-odborný časopis* [online]. 2019, 3(1), 168–183 [cit. 2020-02-08]. ISSN 1339-8725. Available: https://www.upjs.sk/public/media/20805/Rovnanova_Sukolova.pdf

63. Runhaar, P. et al. Stimulating teachers' reflection and feedback asking: An interplay of self-efficacy, learning goal orientation, and transformational leadership. *Teaching and Teacher Education* [online]. 2010, 26(5), 1154–1161 [cit. 2020-01-07]. ISSN 1879-2480. Available: <https://doi.org/10.1016/j.tate.2010.02.011>

64. Sámelová, S. *Žiak a jeho postavenie vo vyučovacom procese*. Banská Bystrica: Belianum, 2014. 112 p. ISBN 978-80-557-0682-5.

65. Soodak, L., Podell, D. Teacher Efficacy and Student Problem as Factors in Special Education Referral. *The Journal of Special Education* [online]. 1993, 27(1), 66–81 [cit. 2020-01-22]. ISSN 1538-4764. Available: <http://dx.doi.org/10.1177/002246699302700105>

66. Stajkovic, A., Luthans, F. (1998). Self-Efficacy and Work-Related Performance: A Meta-Analysis. *Psychological Bulletin* [online]. 1998, 124(2), 240–261 [cit. 2020-01-22]. ISSN 1939-1455. Available: <https://doi.org/10.1037/0033-2909.124.2.240>

67. Tabachnick, B. G., Fidell, L. S. *Using Multivariate Statistics*. 7th ed. New York: Pearson, 2018. 848 p. ISBN 978-0-13-479054-1.

68. Tóthová, R. et al. *Žiak, učiteľ a výučba*. Prešov: Rokus, 2017. 370 p. ISBN 978-80-8951-061-0.

69. Tripp, T., Rich, P. Using video to analyze one's own teaching. *British Journal of Educational Technology* [online]. 2012, 43(4), 678–704 [cit. 2020-01-11]. ISSN 1467-8535. Available: <https://doi.org/10.1111/j.1467-8535.2011.01234.x>

70. Tugui, C. Systematic reflective enquiry methods in teacher education. *Procedia – Social and Behavioral Sciences* [online]. 2011, 29, 533–538 [cit. 2020-03-10]. ISSN 1877-0428. Available: <https://doi.org/10.1016/j.sbspro.2011.11.272>

71. Urzúa, A., Vásquez, C. Reflection and professional identity in teachers' future-oriented discourse. *Teaching and Teacher Education* [online]. 2008, 24(7), 1935–1946 [cit. 2020-03-17]. ISSN 1879-2480. Available: <https://doi.org/10.1016/j.tate.2008.04.008>

72. Vágnerová, M. *Vývojová psychologie: dětství a dospívání*. 2nd ext. and rev. ed. Praha: Karolinum, 2012. 536 p. ISBN 978-80-246-2153-1.

73. Veteška, J., Tureckiová, M. *Kompetence ve vzdělávání*. Praha: Grada, 2008. 160 p. ISBN 978-80-247-1770-8.

74. Yost, D. S. Reflection and Self-Efficacy: Enhancing the Retention of Qualified Teachers from a Teacher Education Perspective. *Teacher Education Quarterly* [online]. 2006, 33(4), 59–76 [cit. 2020-03-21]. ISSN 0737-5328. Available: <https://files.eric.ed.gov/fulltext/EJ795226.pdf>

75. Zee, M., Koomen, H. M. Teacher Self-Efficacy and Its Effects on Classroom Processes, Student Academic Adjustment, and Teacher Well-Being: A Synthesis of 40 Years of Research. *Review of Educational Research* [online]. 2016, 86(4), 981–1015 [cit. 2019-11-28]. ISSN 1935-1046. Available: <https://doi.org/10.3102/0034654315626801>

76. Zibrinyiová, V. Potenciál tréningu exekutívnych funkcií v zlepšovaní sebaregulácie. *Človek a spoločnosť. Internetový časopis pre pôvodné teoretické a výskumné štúdie z oblasti spoločenských vied* [online]. 2014, 17(4), 53–60 [cit. 2020-02-

06]. ISSN 1335-3608. Available: <http://www.clovekaspolocnost.sk/jquery/pdf.php?gui=21LNUPGDQ6Z9BHSBDUTWYMN7>

Primary Paper Section: A

Secondary Paper Section: AM

OPTIONS OF ADDRESSING POWER SUPPLY DISRUPTION IN THE CONDITIONS OF THE CZECH REPUBLIC: A CASE STUDY

^aSTEPAN KAVAN, ^bALENA OULEHLOVA

^aFire Rescue Services of South Bohemia Region, Pražská 52 b, 370 04 České Budějovice and University of South Bohemia in České Budějovice, J. Boreckého 1167/27, 370 11 České Budějovice, ^bUniversity of Defence, Kounicova 65, 662 10 Brno
email: ^astepan.kavan@email.cz, ^balena.oulehlova@unob.cz

Abstract: The aim of the research described in the article is to examine the options of addressing power supply disruption in the selected sectors of infrastructure due to emergency situation: snowfall in the area of Český Krumlov and Prachovice districts in the Czech Republic on April 28, 2017. Based on the characteristics of climatic, meteorological and geographic data, consequences of power supply disruption are described with emphasis on the approach of the electricity distributor and the affected infrastructure (transport and communication networks - mobile operators) in selected sectors. Reflection on the intervention activities of the Fire Rescue Service units in making roads passable has been carried out. The article evaluates preparedness and intervention activities based on the case study of emergency situation management procedures related to the selected infrastructure and suggests recommendations for their improvement.

Keywords: emergency situation, electricity, transport, communication, blackout, mobile operator.

1 Introduction

According to the Intergovernmental Panel on Climate Change, climate change is manifested by a rapid increase in the number of extreme hydrometeorological phenomena [1]. Local and nationwide climatic and hydrological extremes have both short-term and long-term negative impacts on the safety of population, property, infrastructure, environment and the state as a whole. Extreme weather fluctuations can have far-reaching impacts on human society by the change in the performance of ecosystem services [2], and thus affecting the safe sustainable development. It is therefore essential not only to analyse the impacts of extreme phenomena, but also to predict and monitor their occurrence as well as identify the possibilities of adaptation and mitigation measures. This is the only way how to develop a disaster-resistant society and thus contribute to achieving sustainable development [3]. For this purpose, international institutions have begun to promote the fact that states, as responsible authorities, should define requirements for providing security and safety in the priority areas for which the greatest climate changes are assumed. These areas include forestry, agriculture, water management, healthcare, landscape, industry, energetics, emergency situations and population protection.

Simultaneously to the occurrence of extreme weather phenomena, the frequency and intensity of threats to the power system [4] increases. The increasing number of disruptions, whether by natural or anthropogenic threats, to major infrastructures has made it necessary to identify and establish protection and security requirements for the critical infrastructure sectors. Their disruption has a direct impact on the functioning of facilities and systems essential for the functioning of the state sustainable development and can demonstrate cascading effects on other sectors [5]. Therefore, it is very important to properly set up a disaster risk mitigation policy or strategy to promote competitiveness, sustainability and resilience of critical infrastructure entities [6].

Achieving sustainable development is burdened by a number of dynamic changes and impacts which society can become prepared for through crisis management. Crisis management consists of preparedness, response, recovery and mitigation phases [7, 8]. Implementation of disaster risk management forms the basis for successful crisis preparedness. This is based on a thorough risk analysis and evaluation and its subsequent management to support resilience. The first step towards effective crisis preparedness of the Integrated Rescue System components was the risk identification in the territory. In 2016, a Threat Analysis for the Czech Republic (CZ) [9] was conducted, which assessed the large-scale power supply disruption as an

unacceptable risk. Unacceptable risks have been identified in the context of climate change – long-term drought, extremely high temperatures, rainstorm floods, heavy rainfall, extreme winds and floods. Subsequently, a threat analysis for individual regions of the Czech Republic was carried out by the methodologically consistent procedure (the total number of regions in the Czech Republic is 14). 13 out of 14 regions have identified the large-scale power supply disruption as an unacceptable risk. All regions in the Czech Republic assessed floods as an unacceptable risk, rainfall floods and long-term drought by 10 regions, extreme winds by 8 regions, extremely high temperatures by 5 regions, heavy rainfall by 1 region. The performed risk assessment became the basis for the preparation of a new type of plans and crisis plans of regions which represent the basic documentation of crisis planning.

The sources of the threat of power supply disruption are:

- Natural threats (bad weather, natural disasters),
- Accidental threats (resulting from system operation and maintenance, human factor failure and faults),
- Deliberate threats (including deliberate human activity, terrorism, crime) [10].

A detailed analysis of the electricity supply disruption in Europe [10] over a period of 15 years shows that the second most common cause is represented by natural threats followed by accidental threats. Even the authors of Duan Xianzhong and Su Sheng [11] list the causes of natural origin as frequent reasons for a power failure. Such manifestations of bad weather can be linked to the manifestations of climate change. Compared to technical defects, natural threats are more dangerous because of the virtually impossible prevention of extreme weather conditions. An example may be weather effects that cause tree uprooting and their subsequent fall on the transmission and distribution system lines.

The issue of power supply disruption is addressed in the scientific literature from several different perspectives. The topic of power outage is the subject of many studies in the field of power engineering. It represents a relatively new phenomenon from an interdisciplinary perspective of security studies and social sciences [12, 13]. The risk of power outages was investigated mainly from a technical point of view, where attention was focused on finding suitable technical and engineering solutions, how to prevent this phenomenon, or how to minimize the consequences of the outage to cause the least possible damage. Despite all efforts to design safer systems, we are still witnessing major large-scale emergency situations. As a rule, the view of the socio-technical risk management system is addressed, which includes several levels from legislators, through managers and work planners, to system operators [14, 15]. Disaster minimization is given attention in terms of communication, community health, preparedness of teams for correct decision-making process and management [16, 17, 18].

According to the authors' survey, a comprehensive evaluation of dealing with the consequences of power outage by specific entities in the area of Fire Rescue Services units, electricity distributors, security of railway transport and provision of mobile operator services has not been published at the international level. Scientific literature sources can be found that deal with the issue of power supply disruption by stabilising and manipulation in the transmission system [19, 20, 21]. Other authors focus more on possible causes, disaster prevention, health issues [22, 23, 24] and resilience, optimization and risk management in the society with regard to possible social and economic impacts [25, 26, 27, 28]. However, the results of research into the topic of the response of individual entities to power disruption in the form of a case study have not been published in the available scientific sources yet.

From the Czech Republic point of view, the low-voltage distribution system (0.4/0.23 kV) creates the largest part of the electricity system and is also the most vulnerable as it is led at outdoor support points (poles or columns) and is easily accessible without significant security protection against both risks of deliberate damage and natural risks. In the transmission system, security criteria n-1 or n-2 are implemented to prevent its disintegration. In terms of natural threats, the transmission system may be most affected by strong winds with velocity of above 100 km/h, landslides and icing.

Power supply outage, no matter where and when it happens, can be divided into the following four stages – Pre-condition, Origin, Chain of events and End [29]. In terms of crisis management, the third phase, Chain of events, is essential. During this phase, crisis management authorities and the Integrated Rescue System components must implement intervention and measures to mitigate the impact of the power supply outage on the population, taking into account their physiological needs and addressing the problem accumulation on interdependent infrastructures. The power supply outage can last from a few minutes to several weeks, depending on the nature of the blackout and the electrical network settings, so a distinction is made between:

- First stage – several-hour transmission system outage without serious damage,
- Second stage – several-day or week outage,
- Third stage – several-week or longer outage.

Short-term and long-term impacts of power supply outage are directly or indirectly manifested in economic areas [30], emergency services, mental health of inhabitants, social well-being, communication and information technologies, transport, public administration, services, water supply, waste and wastewater management, healthcare, heat and gas supply, banking, production, food supply and distribution as well as environmental. Communication between the intervening components with different roles and competences, private entities and population can be considered as the biggest challenge and the most complicated activity when dealing with power supply outage [31]. Providing communication is one of the elements of a resilient society which disruption reduces its functioning during an emergency situation [32].

The territory of the Czech Republic has not yet been affected by a major blackout, as shown in Table 1. Short-term and medium-term local power outages were reported in connection with floods, storms, snow calamities, icing, transformer station fires or accidental equipment damage (human error). Table 1 shows that the occurrence of the hurricane Xaver (year 2013) and the hurricane Herwart (year 2017) caused an increase in the average duration of one power outage in the electricity distribution at the customer (the so-called CAIDI indicator). The PREdistribution operator has the shortest power outage time. The reason is that it provides distribution only for the territory of the capital city of Prague and its surroundings and the distribution system has an interconnected structure. The distribution system operator E.ON Distribution has the longest period of power outage. Its activities comprise South Bohemia, South Moravia, partly in the Vysočina Region and the Zlín Region. It is an area with a total area of 26,500 km² [33], where the interconnection of the structure is lower and it has specific geographical and climatic conditions. The power supply after emergency situations of natural origin was mostly restored within 48 hours in the Czech Republic. Despite this, the safety of the population can be significantly affected during this period and it can cause economic damage of hundreds of millions CZK.

The article defines the causes and effects of power supply outage in its theoretical part. It compares interventions, intervention activities and damage on the example of hurricanes that hit the territory of the Czech Republic in the last two decades. The hurricane occurrence results in short to medium-term power supply disruptions, practical verification of crisis preparedness and real verification of the skills acquired during the exercises of

crisis management bodies and Integrated Rescue System components. The practical part of the article explains the procedures of one of the Integrated Rescue System components and private entities when dealing with crisis situation on the example of extreme meteorological phenomenon, spring snow phenomenon, and its impacts on selected types of energy, transport and communication infrastructure. The article evaluates crisis preparedness and intervention activities of entities and points out the necessity of coordination of activities in dealing with an emergency situation.

Tab. 1. Average time duration of one electricity distribution disruption in the 2009–2018 period in the Czech Republic

Year	2009	2010	2011	2012	2013	
CAIDI [min]	138	125	113	113	133	
Distribution system operator						
ČEZ Distribution	138	112	103	101	129	
E.ON Distribution	159	172	157	175	161	
PREdistribution	49	76	72	79	68	
Year	2014	2015	2016	2017	2018	2019
CAIDI [min]	119	119	117	156	114	124,38
Distribution system operator						
ČEZ Distribution	102	110	108	147	112	120,35
E.ON Distribution	180	156	158	199	124	142,48
PREdistribution	59	86	99	70	85	81,87

Source: [34]

Due to the high risk of a crisis situation incurrence in the power supply disruption, crisis management authorities and the Integrated Rescue System components pay increased attention to this danger and test their readiness for it through exercises. Since 2014, exercise aimed at the topic of power supply disruption has been carried out in 9 regions. In most exercises performed, extreme meteorological phenomena were the cause of power supply outage. On the basis of the resulting findings, regions try to eliminate shortcomings and improve their crisis preparedness.

The crisis management authorities together with the Integrated Rescue System components also gain experience with the power supply disruption from past emergency or crisis situations caused mainly by strong wind or hurricane. The most important were the hurricane Kyrill (year 2007), Emma (year 2008), Herwart (year 2017) and Sabine (year 2020). Table 2 shows that Kyrill was the strongest in terms of wind speed, however Herwart was the strongest in terms of incidents dealt with. Compared to the maximum number of events resolved on the first day of the Hurricane Kyrill (3,603), the number of events resolved on the first day at the Herwart hurricane was more than double (8,254). That is why Herwart was a much larger emergency event in terms of operational management, although fewer firefighters were deployed [35]. However, as a result of the hurricane Kyrill, an emergency state was declared, which did not happen after another hurricane. Even the example of the weakest hurricane Sabine shows that the total number of responses was 30 times higher than the long-term daily average. Increasing the accuracy and reliability of strong wind prediction, personnel and technical reinforcement of fire brigade units when declaring a strong wind danger for intervention purposes and informing the population with safety instructions leads to increased preparedness and minimization of losses caused.

Tab. 2. Comparison of the most important hurricanes in the Czech Republic

	Kyrill	Emma	Herwart	Sabine
Date	18. 1. 2007	1. 3. 2008	29. 10. 2017	10. 2. 2020
Time of duration	4 days	2 days	3 days	2 days
Wind strength	216 km/h	169 km/h	182 km/h	184 km/h
Declared state	State of emergency (government of CR)	State of emergency (CEZ) and state of calamity in the energy sector	State of calamity in the energy sector (CEZ)	State of calamity in the energy sector (CEZ)

	Kyrill	Emma	Herwart	Sabine
Number of emergency calls	48,833	27,900	29,305	13,000
Number of events resolved by fire brigade units	7,729	4,258	9,925	5,488
Maximum of events in 1 day 1	3,603	3,138	8,254	3,988
Firefighters deployed	33,822	11,500	13,000	-
Firefighters injured	26	11	5	0
Number of dead	6	2	4	1
Reported insurance claims (CZK)	2.25 billion	1.4 billion	1.45 billion	0.59 billion
Damaged wood in the forests (million m ³)	6	2	1.7	0.95

Source: modified source [35, 36]

2 Materials and Methods

The aim of the article is, using a case study, to research the options of addressing the impacts of power supply disruption due to snowfall emergency situation in the Český Krumlov and Prachatice districts (part of the South Bohemian Region) in the Czech Republic on 28 April 2017 on the selected areas of infrastructure. The subject of the research into the selected areas of infrastructure was the response of the electricity power distributor, the activities and interventions of the Fire Rescue Service units, the specifics of providing railway transport security and the functionality of communication in the network of mobile operators. The research does not address the impacts of power supply disruptions to areas other than those listed due to the unavailability of data or the unwillingness to provide data. A partial objective was to carry out a qualitative evaluation of crisis preparedness and intervention activities and to propose recommendations for their improvement on its bases. Causal climatic and meteorological conditions, which caused the power supply disruption are characterized. In order to achieve the objective, specific activities were qualitatively analysed from the point of view of the electricity distributor, transport and communication with an emphasis on mobile operators. Analysis was used in the research as a method based on the decomposition of the whole into elementary parts, it is a method of examining more complex facts by their dissolution into simpler, basic units. The aim of the analysis was to identify the essential and necessary properties of the elementary parts of the whole and to identify their essence and regularities.

The research was performed as a case study in the conditions of the Czech Republic. From the research point of view, it is therefore a research limitation focusing only on the affected area of the Český Krumlov and Prachatice districts.

Information was from the methodological point of view obtained mainly from scientific literature research, from guided interviews with representatives of the individual organizations concerned and from internal sources of selected subjects. In the theoretical part of the article, the comparison method was used. The comparison was used to compare selected impacts of power supply outage, interventions and intervention activities carried out by the Fire Rescue Service and municipality units of the voluntary fire brigades during the hurricanes affecting the whole area of the Czech Republic, where there was also a local power supply disruption and the declaration of the state of calamity in the energy sector. Descriptive scientific methods and interview methods were used in the practical part which were especially predicting the occurrence of one phenomenon based on the occurrence of another phenomenon. An important method for obtaining information and fulfilling the aim was a method of guided interviews. The interview method is based on direct questioning, i.e., on verbal communication of the researcher (authors) with the respondent. During the interviews,

representatives of the entities concerned were interviewed in order to find out real information about the course of the emergency situation. Furthermore, the synthesis as a process of joining several parts into one whole, served to interconnect particular pieces of knowledge.

The research was carried out as a systematic investigation into the phenomena in order to obtain knowledge that describes and explains the current readiness of selected organizations for the consequences of power outages. The research part included a systematic process of gathering information, synthesizing already-existing knowledge and achieving an increase in the knowledge [37]. The aim was to get a unified view of the subject of the study – options of addressing and the readiness of selected entities for power failure. On the one hand, the aim was to separate individual areas of security issues - civil protection, on the other hand, these individual areas were kept as much as possible in the context of other areas.

3 Case Study

Practical part of the research described in the article defines the geographical, climatic and meteorological conditions that led to snowfall in an atypical month of April 2017. It evaluates the response of affected entities and proposes recommendations based on the results of impacts on the energy, transport and communication infrastructure.

The power supply disruption in the low-voltage distribution system occurred on 28 April 2017 in part of the South Bohemian Region, the Český Krumlov district (1,614 km²) and the Prachatice district (1,375 km²). Average population density in the South Bohemian Region is 63.3 inhabitants/km². The lowest population density per km² is reported by the Český Krumlov Region, where the average population density per km² is 37, which ranks it on the last place not only in the South Bohemian Region but also within the Czech Republic as a whole. The average population density in the Prachatice district is 37.6 inhabitants/km². The reason for the low population density in the territory of these two districts is the existence of the Šumava mountains and the Šumava foothills with extensive continual forest areas. Due to the low population density, the impact of the power supply outage affected only a relatively small part of the population.

The climate in the evaluated territory can be characterized as the climate of the northern temperate zone. The temperature and precipitation regime tend to be influenced by terrain unevenness and passes from the slightly template areas in lower altitudes into the cold area.

At the beginning of the monitored period on 25 April 2017 the weather in the Czech Republic was relatively warm, the temperature ran from 10 to 16 °C and it was raining even in the mountains. It was gradually getting colder, at altitudes above 1,000 m above the sea level, the temperature on 26 April and 27 April 2017 was just around zero (-1 °C; +1 °C), in lower altitudes 2 to 5 °C, mixed precipitations or alternately snowfall occurred both in lower and middle altitudes. The snow was quite wet and heavy, it was melting in the lower and middle altitudes, however in the evening with a drop in temperature the continuous snow cover was formed in the lower and middle altitudes and the snow depth was continually increasing. From 26 April 2017 8 o'clock a.m. CET to 27 April 2017. 8 o'clock a.m. CET, the daily total rainfall was in the monitored area of Prachatice and in the Český Krumlov Regions at 9 to 20 mm, while in the mountains with altitude the water value of snow cover was increasing towards total rainfall. The temperature on 28 April 2017 at night and in the morning dropped to zero even in the altitudes of around 400 m above the sea level and in the morning, it was snowing in all altitudes. The snow cover continued to be damp, heavy and contained large percentage of water. Heavy snow caused extensive damage to spring vegetation, foliage and pine trees. With the increasing altitude the length of snowing was prolonging and over 1,000 m above the sea level it was more or less snowing all day. The highest

depth of the snow cover in these altitudes appeared around midnight from 28 April to 29 April 2017. The characteristics of the described development of meteorological conditions on the whole territory can be seen from Table 3.

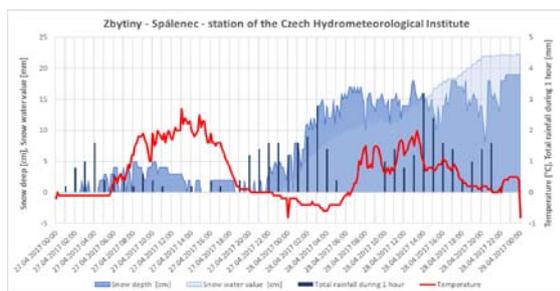
Tab. 3. Development of climatic and meteorological conditions on 27 April and 28 April 2017

Date	Weather	
	Day	Night
27/4/2017	Mostly cloudy, snowing -1 °C to +1 °C	Snowing, sleet 0 °C
28/4/2017	Snowing +4 °C	Snowing 0 °C
Snow cover		
	Altitude	Height
27/4/2017	500–700 m	1–5 cm
	over 1 000 m	10–20 cm
28/4/2017	500–700 m	2–5 cm
	over 700 m	10–25 cm

Source: authors' own

Detailed development of conditions at the selected mountain meteorological station Zbytiny - Spálenec of the Czech Hydrological Institute in the affected territory is graphically depicted in Figure 1. The station is equipped with a snow-measuring cushion that automatically collects the monitored parameters - temperature, total rainfall sum, total snow cover depth and snow water value.

Fig. 1. Development of selected indicators at Zbytiny station on 27 April and 28 April 2017



Source: authors' own processing according to CHMI data

Due to the advanced spring vegetation period, when the deciduous trees were already swollen and with small leaves, the whole trees were uprooted or their tops and branches were broken due to the very wet and heavy snowfall. Many broken trees disrupted the power supply, or blocked roads and railways.

3.1 Power supply disruption in the affected area

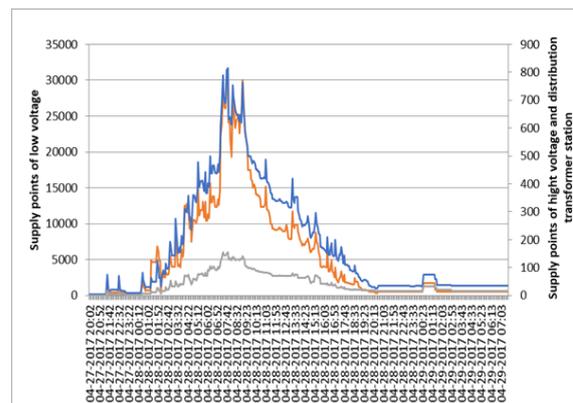
In the evening on 27 April 2017, an increased failure rate began to occur at the high voltage level in the R 110/22 kV Větrní power supply district of Český Krumlov. After midnight there was an increase in the failure rate in the area of switching stations R 110/22 kV Vimperk and Prachatice, which supplies the territory of the district Prachatice. The main cause of increased failure rate was heavy snowfall and rain. Wet snow caused the above-mentioned falls of mainly deciduous trees on the power lines, with consequent damage to the equipment of distribution transformer stations, mainly insulators and high-voltage conductors. The culmination of the emergency situation in terms of the power supply outage appeared in the morning on 28 April 2017. The most affected areas were: Krumlov, Lipno, Kaplice, Volary, Prachatice and Churáňov areas.

Elimination of the consequences of the calamity was complicated by the situation in traffic, where there were impassable roads in the affected area and in some places the Police of the Czech Republic closed traffic due to impassability or danger of trees falling on the roads. During the daytime of 28 April 2017, the damaged sections were continuously restored, distribution station damage was removed and the systems were energized. The work was terminated between 8:00-9:00 p.m. for

the sake of safety of field workers and for keeping safety breaks. During the night on 29 April 2017, no further failures occurred. In the morning of 29 April 2017, the remaining failures on the high and low voltage level were eliminated. Overnight from 28 April to 29 April 2017 the following distribution transformer stations remained out of service:

- Světlík (VET) – 8 DTS, municipality Světlík,
- Dvořiště (VBR) – 1 DTS, municipality Mnichovice,
- Smědeč (PRA) – 10 DTS, municipalities Křišťanov, Spálenec, Majdalena.

Fig. 2. Number of switched off supply points of distribution transformer stations



(Note: low voltage – orange colour, high voltage – grey colour, distribution transformer station – blue colour)

Source: authors' own processing according to E.ON Distribution data

About 65 operations workers participated in the elimination of the consequences of the emergency situation. These were mainly fitters and dispatchers. In addition, other technicians participated in managing work organization. Due to the extent of the emergency situation, the crisis staff of the E.ON company did not meet [38]. Calamities of this extension are solved by standard decision-making processes and competences of individual managers.

3.2 Interventions of the Fire Rescue Service units

South Bohemian Region Fire Brigade and Volunteer Fire Brigade units were clearing trees, that had fallen or were uprooted under the weight of heavy wet snow, from the roads. These were so-called multiple interventions, when firefighters dispatched to one event cleared more fallen trees within one intervention [39].

Most of the multiple interventions were carried out in the area of Prachatice – Volarsko and Český Krumlov. In the evening of 27 April – morning 28 April 2017, the fire brigade units were dispatched to remove fallen or uprooted trees in the Prachatice district 79 times and in the Český Krumlov district 63 times. On 29 April 2017, firefighters in the České Budějovice area were busier in the morning. In the most exposed period, the incidents were reported every two minutes from the emergency lines 112 and 150 to the Operational and Information Centre of the Fire Rescue Service of the South Bohemian Region. In all cases, these were trees fallen on the roads or railways. After seven o'clock in the morning on 29 April 2017 the situation calmed down.

There is no information that a member of the Fire Rescue Service of the South Bohemian Region or Volunteer Fire Brigade units was injured in connection with an emergency situation. From the point of view of the fire protection, it is necessary to point out that the power outage also had some influence on the operation of some fire safety equipment (for

more information on the impacts on the fire safety equipment failure in [40]).

3.3 Impact of the emergency situation on rail transport

There are no electrified railway lines in the area, except for the Rybník – Lipno nad Vltavou – Horní Dvořiště track. With regard to the meteorological forecast of the Czech Hydrometeorological Institute and continuous monitoring of the situation, appropriate measures were taken. Ride of trains was in the so-called “On Sight Regime”. This meant adapting (usually slowing down) the immediate train speed according to the engine driver’s opinion. In the area of Český Krumlov and Prachatice the trees fallen on the railway limited the traffic. Trains were always been able to safely stop in front of the obstacle (fallen tree) that occurred in the clearance profile of the rail track body. No damage to the health of transported passengers or extensive material damage occurred.

Removal of fallen trees from the clearance profile of the rail track was performed by employees of the Strakonice railway station in cooperation with the Fire Rescue Service unit of the Railway Infrastructure Administration and other fire rescue units involved. Some trains were accompanied at the engine driver’s cab by employees equipped with sawmills intended to promptly remove dangerous obstacles on the track. However, no damage to the railway infrastructure in connection with the emergency occurred. Table 4 shows the railway tracks and full recovery times without restrictions during 28 April 2017.

Tab. 4. Overview of putting individual tracks into operation.

Track section	Time of putting into operation on 28 April 2017
Volary – Černá v Pošumaví	7.10 a.m.
Černý Kříž – Nové Údolí	7.40 a.m.
Rybník – Vyšší Brod klášter – Lipno nad Vltavou	12.33 p.m.
Vimperk – Čkyně	2.25 p.m.
Volary – Vimperk – Čkyně	4.55 p.m.
Volary – Prachatice	5.45 p.m.
Kubova Huť – Lipka	10.15 p.m.

Source: authors’ own

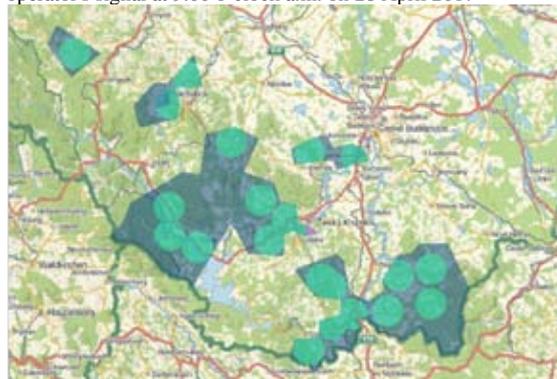
3.4 Influence of emergency situation on signal transmission of mobile operators

Relationship between the power outage and the renewal process can also be documented at the outages of mobile operators’ transmitters. In order to carry out communication using a mobile phone, it is necessary to have the entire infrastructure in operation, from the telephone set to the Base Transceiver Stations, controllers to the main exchange. The main element of the whole system is the power supply of the base stations as they are not backed up to spare sources. Other elements are sufficiently secured in the event of a power outage.

Figures 3–5 graphically show the signal loss of the base stations of the mobile operator during the daytime of 28 April 2017. In the beginning, the signal loss of the base stations covered a significant part of the monitored area. The gradual renewal took place on the basis of renewed power distribution from the distribution network or, in some cases, also through the use of a substitute mobile source. This solution was used mainly for the coverage of the mobile operator’s signal on a class I road in order to provide road safety. The decreasing number of uncovered areas by the mobile operator’s signal (Figures 3–5) can also be seen from the timeline of power supply recovery (Figure 2).

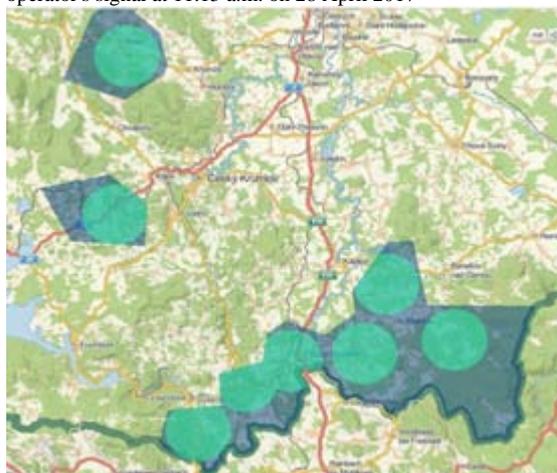
Operation of a uniform alert and notification system to warn the population in the event of emergencies and crisis situations was dependent on the type of sirens used in the area. In the case of installed rotary sirens, their malfunction was obvious, as they are permanently dependent on power supply. Electronic sirens have backup batteries with a maximum operating time of 72 hours. These enabled to provide information to the affected population.

Fig. 3. Areas with non-functional transmission of the mobile operator’s signal at 9.00 o’clock a.m. on 28 April 2017



Source: own processing according to the data provided by the mobile operator

Fig. 4. Areas with non-functional transmission of the mobile operator’s signal at 11.15 a.m. on 28 April 2017



Source: own processing according to the data provided by the mobile operator

Fig. 5. Areas with non-functional transmission of the mobile operator’s signal at 5.30 p.m. on 28 April 2017



Source: own processing according to the data provided by the mobile operator

4 Results

Both the threat of snow calamity and the threat of power supply disruption were identified for the region by the risk analysis. When assessing the risk, the threat of snow calamity was assessed as acceptable. This means that it was not expected to declare a crisis situation and a summary of measures to carry out rescue and liquidation work to avert the threat was developed in the regional emergency plan. In the case of power supply disruption, however, the situation was different. The threat was

assessed as unacceptable in the area of the region and included in the regional crisis plan. The components of the Integrated Rescue System were equipped with the technology for the elimination of an emergency situation and the members underwent both theoretical and practical training. From a formal point of view, preparedness was fulfilled. In terms of practical training of crisis preparedness, the crisis management authorities and the Integrated Rescue System components of the South Bohemian Region were preparing in 2017 for the Blackout 2017 exercise to be held on 4-5 December 2017. The exercise planning phase was one of the most crucial stages. It included detailed analyses of the impacts of the power outage, including prioritization of priority emergency connections, what infrastructure activities and elements must be maintained and how to address impacts in each area. Both the preparation of the exercise and the results of the exercise showed weak points. They become a challenge to carry out further steps towards increased preparedness, provision of resources for preventive and mitigating measures to deal with emergency situations with power supply failure.

The knowledge and experience in dealing with an emergency situation of power supply outage and Blackout 2017 exercise was incorporated into the Crisis Plan of the South Bohemian Region, in particular into the power supply outage plan. The crucial task was to describe and propose communication methods in the case of the failure of traditional means of communication by means of analogue radio communication and messengers (distribution and transfer of information by a natural person). The issue of power supply disruption and transfer of experience was the topic of an international workshop with participants from the Czech Republic and Austria in 2019. The innovative aspect as well as the contribution of the presented study results lie in the specific analysis of the authentic emergency situation, presentation of the interconnectedness of its impacts on individual entities and evaluation of activities in specific areas (Fire Rescue Service units, communication possibilities in the mobile operator's network, impact on rail transport) within the case study.

The study confirmed that practical solution to the emergency situation and exercise with power supply outage topic are necessary for professional preparedness of the staff and quality technical and material equipment. Professional preparedness places demand on the affected entities and crisis management to correctly understand the system interconnectivity, technical possibilities of solutions, including current assessment of the priority concerning electricity consumers. The technical and material equipment consists not only of the required equipment of rescuers, distribution system operators, but also of the preparedness of both mobile and permanent back-up power sources and of the technical preparedness of connection points for alternative power supply for the subjects important for providing basic functions in the territory. An important part is represented also by the provision of fuel for rescuers and back-up power sources.

Another outcome resulting from the implementation of this study was that interventions by both professional and volunteer fire brigade units were carried out according to standard procedures. Effectiveness of the dispatched intervention activity has been evidenced by the increased implementation of multiple interventions which helped to speed up the reconstruction of transport and energy infrastructure, followed by the communication infrastructure. The proposal for fire rescue brigade units in case of prediction of extreme meteorological phenomenon occurrence shall be increasing the number of staff at all stations. The results of the emergency analysis show an enormous increase in the number of calls to emergency line. When declaring a warning by the Czech Hydrometeorological Institute for high or extreme degree of danger, especially for wind, snow, icing and storm phenomena, we recommend to increase the number of emergency lines operators by at least 50% compared to normal situation in order to avoid overloading and promote smooth handling of emergency calls.

The evaluation of the situation showed the need for timely instructing the engine drivers to operate in "On Sight Regime". Timely notification and active operation of the Fire Rescue Service of the Railway Infrastructure Administration and other fire rescue units involved is essential for providing rail safety and minimizing losses. From the standpoint of preparedness, it is essential to have enough trained personnel and technicians ready at hand who would remove fallen trees or power lines on the rail track.

Recommendation resulting from carrying out the study in the area of railway transport in the affected area is to restore the power supply for the Rybník – Lipno nad Vltavou – Horní Dvořiště track as it is an international railway line between the Czech Republic and Austria. Otherwise it is necessary to introduce a substitute bus service, which however, may be delayed due to poor road passability. In the event of a major power supply outage, for non-electrified railway lines, the operator must provide personnel, fuel supply, process alternative variant train traffic diagrams, add back-up power sources to designated railway stations, provide level crossing safety equipment and support for the crossing barriers in open position (which is crucial for the priority roads or as required by the Integrated Rescue System components). The operation of the level crossing interlocking equipment has spare power sources. Rechargeable batteries have a service life of only 3-6 hours, after which the level crossing signalling equipment stops working. In order to reduce accidents at level crossings at the time of power supply disruption, it is necessary to inform the drivers to be more careful when crossing level crossings and the engine drivers must provide an audible signal from the train before approaching the crossing.

It is clear from the analysis and experience gained by addressing this specific emergency situation that in case of a medium-term power outage in the area of communication, the Digital Radio Network of the Ministry of the Interior of the Czech Republic - PEGAS and the analogue radio network of the Fire Rescue Service of the South Bohemia Region which would provide communication between selected basic components of the Integrated Rescue System and crisis staffs of municipalities with extended powers would keep working, however in a limited extent. In the current situation of digitization and widespread use of mobile phones the problem lies in the communication infrastructure of mobile operators. As mentioned above, functional operation of all elements is essential to provide communication. Base stations are the weakest elements of the whole infrastructure. It is recommended that mobile operators, especially at base stations and other vulnerable infrastructure elements, build up back-up power sources or enhance the capacity of rechargeable batteries. This is because mobile phones represent an essential tool for informing the population about imminent or emerging dangers, as well as means for the population how to contact the emergency line. The failure of the mobile operator can complicate the saving of human lives. In the case of the researched situation and area, the advantage was that the failure of the mobile operator appeared in low-populated areas.

The carried-out analysis dealing with the emergency situation in the Prachaticce and Český Krumlov districts showed that the readiness to resolve the medium-term power supply outage in a limited area is at sufficient level. Individual entities cooperated and exchanged information. Media coverage of the emergency situation at the nationwide level also contributed to the awareness among the population, although none of the crisis states was declared and individual authorities managed the resolution of the emergency situation by their own means and forces.

5 Conclusion

Achieving territorial resilience as a tool for promoting sustainable development is not possible without public and private sector authorities being aware of the responsibilities for preventing emergencies and crisis situations, preparedness,

response and recovery. Power supply disruption regardless of the source of the threat represent one of the greatest security risks of present day. Dependence of man and society on electricity supplies makes us highly vulnerable to the threat. Even short-term power supply disruptions create technical and operational problems with impacts on all economic sectors, e.g., healthcare, accommodation services, water supply, food production and sale [41]. Resilience in connection with the power supply disruption must also include self-sufficiency and preparedness. Building them up on the side of stakeholders is time and financially demanding or even unreachable in this case. Preparedness and readiness checking help to estimate the extent of impacts, plan resources and propose specific countermeasures. This approach will provide greater flexibility, interoperability, increase security and independence compared to simply relying approach on the Integrated Rescue System components and crisis management authorities. Otherwise, serious security and economic impacts, a slowdown in regional development and other regional problems may occur [42, 43].

A repetition of a comparable emergency situation cannot be excluded due to the manifestations of climate change. Extreme meteorological phenomena with similar or even greater impacts than the analysed situation on 28 April 2017 affect parts or the whole territory of the Czech Republic more often. In the first step, it is necessary to strengthen the role and capabilities of the Czech Hydrometeorological Institute in relation to the prediction and subsequent monitoring of these phenomena occurrence. Both the society and individuals need to keep preparing to address short and long-term power outages. Preventive preparation of individuals must be based on making necessary preventive provisions of basic food, water and medicine for personal use. At municipal, regional or national level, society must be able to maintain communication flows between crisis management authorities and the Integrated Rescue System, as well as towards the population and other stakeholders. The possibility is to use emergency (permanent or mobile) power sources, however especially in pre-reflected prepared basic procedures. This also means providing adequate supply of fuel quantities.

The presented and analyzed example of an emergency situation, snowfall from 28 April 2017, when a medium-term power supply outage occurred in the relatively limited territory of the region, represents one of the potential threats to the safety of the society. Based on the characteristics of climatic and meteorological causes of the emergency situation occurrence, the intervention activities of Fire Rescue Service units as well as private entities in the field of energy, transport and communication were described. Due to the unavailability of information, it was not possible to present other areas affected by power outage in detail, as the willingness to provide this information by relevant stakeholders was missing. Measures for prevention and mitigation in the case of repeated threats in the researched areas were proposed. The results of the evaluation of the emergency situation show that the restoration of the technologies of mobile operators is dependent on the power supply and it is necessary to strengthen their resilience by means of back-up energy sources. The components of the Integrated Rescue System did not have to address the impact of a large extent on the population due to the less populated, mainly rural areas.

Literature:

1. IPCC. *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 2014. 151 pp.
2. Jentsch, A., & Beierkuhnlein, C. Research frontiers in climate change: Effects of extreme meteorological events on ecosystems. *Comptes Rendus Geoscience*. 2008, 340(9-10), 621-628. doi.org/10.1016/j.crte.2008.07.002
3. Kovacova, L. Achieving of Environmental Safety through Education of Modern Oriented Society. In *14th SGEM*

GeoConference on Ecology, Economics, Education and Legislation. 2014, pp. 3-8. doi.org/10.5593/SGEM2014/B52/S2.0001.

4. Ministerstvo životního prostředí (Ed.). *Strategie přizpůsobení se změně klimatu v podmínkách ČR*. Ministerstvo životního prostředí. 2015.
5. Luijff, E., Nieuwenhuijs, A., Klaver, M., van Eeten, M., Cruz, E. Empirical Findings on Critical Infrastructure Dependencies in Europe. In R. Setola & S. Geretshuber, *Critical Information Infrastructure Security*. 2009, pp. 302–310. Springer.
6. Oulehlova, A. Identification of the Electricity Blackout Impacts on the Environmental Security. In *Risk, Reliability and Safety Innovating Theory and Practice*. 2017. pp. 2175-2182. Taylor & Francis Group.
7. Haddow, G. D., Bullock, J. A., & Coppola, D. P. *Introduction to Emergency Management* (6 ed.). Elsevier. 2014. ISBN 978-0-12-407784-3.
8. Survila, A., Tvaronavičienė, A., Shapoval, R., & Peleckienė, V. Defence and Security Public Procurement: Analyses of Managerial and Legal Issues. *Journal of Security and Sustainability Issues*, 2016, 6(2), 299-314. ISSN 20297017. doi:10.9770/jssi.2016.6.2(9).
9. Vláda České republiky. *Usnesení Vlády České republiky k Analýze hrozeb pro Českou republiku*. 2016. Praha: Vláda České republiky, Sv. č. 369.
10. Nepal, R., Jamasb, T. Security of European electricity systems: Conceptualizing the assessment criteria and core indicators. *International Journal of Critical Infrastructure Protection*. 2013, 6(3-4), 182-196. ISSN 18745482. doi:10.1016/j.ijcip.2013.07.001.
11. Xianzhong, D., & Sheng, S. Self-Organized Criticality in Time Series of Power Systems Fault, Its Mechanism, and Potential Application. *IEEE Transactions on Power Systems*. 2010, 25(4), 1857-1864. ISSN 0885-8950. doi:10.1109/TPWR.2010.2058932.
12. Yang, T., Liu, W. A General Overview of the Risk-Reduction Strategies for Floods and Droughts. *Sustainability*. Hsinchu, Thajvan, 2020, 12(7). ISSN 2071-1050. doi:10.3390/su12072687.
13. Moon, J., Sasangohar, F., Son, C., Peres, S.C. Cognition in crisis management teams: an integrative analysis of definitions. *Ergonomics*. 63(10), 2020, pp. 1240-1256. ISSN 00140139. doi: 10.1080/00140139.2020.1781936.
14. Rasmussen, J. Risk management in a dynamic society: A modelling problem. *Safety Science*. Volume 27, Issue 2-3, November/December 1997, Pages 183-213. ISSN 09257535. doi: 10.1016/S0925-7535(97)00052-0.
15. Ghasemi, S., Mohammadi, M., Moshtagh, J. A new look-ahead restoration of critical loads in the distribution networks during blackout with considering load curve of critical loads. *Electric Power Systems Research*, 2021, 191. doi: 10.1016/j.epr.2020.106873.
16. Pueyo Centelles, R., Meseguer, R., Freitag, F., Navarro, L., Ochoa, S. F., Santos, R. M. LoRaMoto: A communication system to provide safety awareness among civilians after an earthquake. *Future Generation Computer Systems*, 2021 115, pp. 150-170. doi: 10.1016/j.future.2020.07.040.
17. Casey, J. A., Fukurai, M., Hernandez, D., Balsari, S., Kiang, M. V. Power Outages and Community Health: A Narrative Review. *Current Environmental Health Reports*. 2020, 7, pp. 371–383. doi: 10.1007/s40572-020-00295-0.
18. Thürmer, J. L., Wieber, F., Gollwitzer, P.M. Management in times of crisis: Can collective plans prepare teams to make and implement good decisions? *Management Decision*, 2020, Vol. 58 No. 10, pp. 2155-2176. doi: 10.1108/MD-08-2020-1088.
19. Tabibzadeh, M., Lahiry, S. Adopting the AcciMap Methodology to Investigate a Major Power Blackout in the United States: Enhancing Electric Power Operations Safety. In: *Advances in Intelligent Systems and Computing*. Volume 1213 AISC, 2021, Pages 581-588. AHFE Virtual Conferences on Software and Systems Engineering, and Artificial Intelligence and Social Computing, 2020; San Diego; United States; 16 July 2020 through 20 July 2020. ISSN 21945357. ISBN 978-303051327-6. doi 10.1007/978-3-030-51328-3_79.
20. MollahassaniPour, M., Taheri, I., Hasani Marzooni, M. Assessment of transmission outage Contingencies' effects on

- bidding strategies of electricity suppliers. *International Journal of Electrical Power and Energy Systems*. 2020, Volume 120. ISSN 01420615. doi 10.1016/j.ijepes.2020.106053.
21. Mishra, D.K., Ghadi, M.J., Azizivahed, A., Li, L., Zhang, J. A review on resilience studies in active distribution systems. *Renewable and Sustainable Energy Reviews*. 2021, Volume 135. ISSN 13640321. doi 10.1016/j.rser.2020.110201.
22. Tsadikovich, D., Kamble, A., Elalouf, A. Controlled information spread for population preparedness in disaster operations management. *International Journal of Disaster Risk Reduction*. 2020, Volume 42. ISSN 22124209. doi 10.1016/j.ijdr.2019.101338.
23. Holt, J. B., Matthews, K. A., Lu, H., Greenlund, K. J., Thomas, C. W. Small area estimates of populations with chronic conditions for community preparedness for public health emergencies. *American Journal of Public Health*. 2019, 109(8), pp. 1079-1083. ISSN 00900036. doi 10.2105/AJPH.2019.30.5150.
24. Aliyana, E., Aghamohammadia, M., Kia, M., Heidari, A., Shafie-khah, M., Catalão, J. P.S. Decision tree analysis to identify harmful contingencies and estimate blackout indices for predicting system vulnerability. *Electric Power Systems Research*. 2020, Volume 178. ISSN 0378-7796. doi 10.1016/j.epr.2019.106036.
25. Ding, T., Li, C., Yan, C., Li, F., Bie, Z. A Bilevel Optimization Model for Risk Assessment and Contingency Ranking in Transmission System Reliability Evaluation. *IEEE Transactions on Power Systems*. 2017, Volume 32, Issue 5. ISSN 08858950. doi 10.1109/TPWRS.2016.2637060.
26. Tselios, V., Tompkins, E. L. Can we prevent disasters using socioeconomic and political policy tools? *International Journal of Disaster Risk Reduction*. 2020. Volume 51. ISSN 22124209. doi 10.1016/j.ijdr.2020.101764.
27. Tselios, V., Tompkins, E. L. What causes nations to recover from disasters? An inquiry into the role of wealth, income inequality, and social welfare provisioning *International Journal of Disaster Risk Reduction*. 2019, Volume 33. ISSN 22124209. doi 10.1016/j.ijdr.2018.10.003.
28. Vaillancourt, A., Haavisto, I. Country logistics performance and disaster impact. *Disasters*. 2016, Volume 40, Issue 2. ISSN 03613666. doi 10.1111/disa.12146.
29. Sesame. *Securing the European Electricity Supply Against Malicious and accidental threats. D1.1 Analysis of historic outages*. Version: 2.0, 2011, 107 p. Available online: URL https://www.sesame-project.eu/publications/deliverables/d1-1-report-on-the-analysis-of-historic-outages/at_download/file.
30. Dźwigoł, H., Dźwigoł-Barosz, M., Zhyvko, Z., Miśkiewicz, R., Pushak, H. Evaluation of the energy security as a component of national security of the country, *Journal of Security and Sustainability Issues*. 2019, 8(3): 307-317. [http://doi.org/10.9770/jssi.2019.8.3\(2\)](http://doi.org/10.9770/jssi.2019.8.3(2)).
31. Oulehlova, A., Kavan, S. Preparation for Providing Crisis Communication during Blackout Occurrence. In: *Proceedings of the 30th International Business Information Management Association Conference, Vision 2020: Sustainable Economic development, Innovation Management, and Global Growth*. Madrid: International Business Information Management Association (IBIMA), 2017, pp. 1416-1425. ISBN 978-0-9860419-9-0.
32. Kapucu, N., Ozerdem, A. *Managing Emergencies and Crisis*. Burlington: Jones & Bartlett Learning, 2013. ISBN 978-0-7637-8155-2.
33. *E.ON Distribuce elektřiny*. Dodavatelektřiny. [quote 2020-04-29]. Available online: URL <https://dodavatelektřiny.cz/dodavatele/eon/distribuce-elektřiny>
34. Roční zpráva o provozu ES ČR 2019. In: *ERU* [online]. Praha: ERU, 2019 [quote. 2021-02-01]. Available online: URL https://www.eru.cz/documents/10540/5381883/Rocni_zprava_pr_oovoz_ES_2019.pdf/debe8a88-e780-4c44-8336-a0b7bbd189bc.
35. Statistické vyhodnocení následků působení orkánu Herwart. *112 - odborný časopis požární ochrany, integrovaného záchranného systému a ochrany obyvatelstva* [online]. 2018, XVII(1) [quote 2020-04-01]. ISSN 1213-7057. Available online: URL <https://www.hzscr.cz/clanek/casopis-112-rocnik-xvii-cislo-1-2018.aspx?q=Y2hudW09MTE%3D>.
36. Studená, N. *Bilance orkánu Sabine dne 10. února 2020* [online]. Praha: MV-GŘ HZS ČR, 2020, 11.2.2020 [quote. 2020-04-01]. Available online: URL <https://www.hzscr.cz/clanek/bilance-orkanu-sabine-dne-10-unora-2020.aspx>.
37. Jensen, N., Rice, A., Soland, J. The Influence of Rapidly Guessed Item Responses on Teacher Value-Added Estimates: Implications for Policy and Practice. *Educational Evaluation and Policy Analysis*. Sage Publications INC. USA, 2018. Volume 40. Issue 2, pp. 267 – 284. ISSN 0162-3737. doi 10.3102/0162373718759600.
38. Adamec, V., Maléřová, L., Berglowiec, P. Krizový štáb obce a jeho budoucnost. *The Science for Population Protection*. 2017, (1), 33-38.
39. Marcinek, M., Marková, I. Working effectiveness of hydraulic rescue equipments for firefighters. *Advanced materials research*. 2014, -(1001), 517-525. ISSN 1022-6680.
40. Pokorný, J., Tomaskova, M., Balazikova, M. Study of Changes for Selected Fire Parameters at Activation of Devices for Smoke and Heat removal and at Activation of Fixed Extinguishing Device. *MM Science Journal*. 2015, 2015(04), 764-767. ISSN 18031269. Available: doi:10.17973/MMSJ.2015_12_201558.
41. Krocova, S., Rezac, M. Infrastructure Operation Reliability in Built-Up Areas. *Communications - Scientific Letters of the University of Zilina*. 2016, 18(1), 75-78. Available online: URL: <http://komunikacie.uniza.sk/index.php/communications/article/view/381>.
42. Dušek, J. Evropské seskupení pro územní spolupráci jako způsob přeshraniční regionální spolupráce v rámci Evropské unie. In *16. mezinárodní kolokvium o regionálních vědách. Sborník příspěvků. 16th International Colloquium on Regional Sciences. Conference Proceedings*. Brno: Masaryk University Press. 2013. pp. 329-336. doi.org/10.5817/CZ.MUNI.P210-6257-2013-40.
43. Dušek, J. Zahraniční spolupráce krajů ČR: minulost, současnost, budoucnost. In: *XVIII. mezinárodní kolokvium o regionálních vědách. Sborník příspěvků. 18th International Colloquium on Regional sciences. Conference Proceedings*. Brno: Masarykova univerzita, 2015, pp. 300-305. ISBN 978-80-210-7861-1. doi: 10.5817/CZ.MUNI.P210-7861-2015-40.

Primary Paper Section: A**Secondary Paper Section: AE, JS**

CHANGES IN CORPORATE STRATEGIES AND CONSUMER BEHAVIOR CAUSED BY COVID-19 AFFECTING MARKETING COMMUNICATIONS AND THEIR TOOLS

^aALENA KUSÁ, ^bLADISLAV PÁTÍK

The Faculty of Mass Media Communication, University of Ss. Cyril and Methodius in Trnava, Námestie J. Herdu 2, Trnava, 917 01, Slovak Republic
email: ^aalena.kusa@ucm.sk, ^bpatik1@ucm.sk

This paper is a partial output of the project VEGA 1/0606/21 Change of preferences in consumer shopping behaviour in the context of the dynamics of the development of marketing communication tools.

Abstract: The development and trends of the 21st century have significantly influenced marketing and marketing communications of companies. Both marketing and marketing communications are undergoing significant changes, especially depending on the overall development of the economy, market and consumer and the changing strategic goals of companies. Successful companies must adapt to the market, clearly formulate their goals and visions for the future, approach brand building through innovation, imaginative and effective communication, find a way to differentiate them from the competition, ie seek the uniqueness of the offer. These approaches are called "Radical Marketing" or "Reengineering". As a result of the above changes and shifts, we are encountering new trends in 21st century marketing communications, which are also changing consumer behavior and vice versa. Consumer behavior and decision-making is greatly influenced by modern forms of marketing communications. In 2020 came COVID-19 and the global pandemic. The global economy, businesses, the market and the consumer have found themselves in a whole new reality. The reality that has come is and will be. The following months and years will show how reversible or irreversible the current situation is. The aim of the paper is a comprehensive view of current strategies of companies and consumer behavior, the definition of their key changes caused by COVID-19 and outlines the current form of marketing communications and its tools.

Keywords: Company, strategy, reengineering, COVID-19, marketing, integrated marketing communications, consumer, consumer behavior, new communication tools

1 Introduction

COVID-19, which caused an epidemic in late 2019, has become a global problem. The pandemic of the new coronavirus became a global health threat throughout 2020, with a direct impact not only on the economy but also on other activities of society as a whole. Because the viruses know no borders, the governments of the affected countries had to take tough measures to slow the spread of COVID-19 in both the first wave of the pandemic and the second wave that hit the world in September 2020. Governments and central banks around the world mobilized and took many measures to eliminate the negative economic consequences of the dynamic spread of an infectious disease pandemic. The Czech Republic was no exception, as it gradually closed part of the sectors of the economy and the borders with neighbouring states as part of many restrictive measures. These measures have significantly reduced the economic activity of the economy.

There is not a single company that is not affected with coronavirus-related, either negative or positive. The measures closed thousands of operations and took jobs from a huge number of people. However, it is this situation that has tested and is testing the ability to adapt to new market conditions, or the viability of companies. Consumer behavior is also changing. Companies had to adapt all areas of their business to this situation - a change in communication, other forms of advertising, a change in assortment, a move to websites and others.

According to Forbes magazine, the impact of COVID-19 on marketing is diverse. While some sectors have been hit hard, others have seen huge growth. A very common problem is, for example, the decline in advertising revenue. Although some areas of marketing may be used by a company in need, other associated services are experiencing a positive increase. An example is online education and various courses, which makes sense because a lot of people now spend most of their time in their homes. When such dramatic changes or events occur, it is important to realize that there is always the potential for new opportunities. It is essential that individuals and businesses reconsider their options and adapt, which often leads to greater

efficiency in the long run. Many marketers change the priority given to certain campaigns to take advantage of current conditions. (www.forbes.cz)

The current situation, which affects the market, raises many questions. For example, is it the right time to invest in a brand? Or how to continue with content marketing? A brand is a value, it is, by no means, just a logo or just a campaign. Value is the result of all the activities that a company creates and marketing participates in it, both through communication but also through distribution, pricing, creativity and building / strengthening relationships with customers.

Many successful companies have had to adapt to the market, clearly formulate their goals and visions for the future, approach brand building through innovation, imaginative and effective communication, find a way to differentiate themselves from the competition, ie seek the uniqueness of the offer. According to Hammer and Champy, these approaches are referred to as "Radical Marketing" or "Reengineering" (Hammer and Champy, 2000).

It is not about improving what already exists or making partial changes that leave the basic structures intact. It's not about patching - partial repairs of existing systems to work better. In fact, this means giving up established procedures and looking again at the work that is necessary to create a product or service of the company, respectively. Providing value to the customer. It means asking the question: "What would this company look like if we rebuilt it today - with current knowledge and using today's technology?" Reengineering a company means throwing away old systems and starting over. It includes going back to the beginning and finding better ways to work. In connection with the concept of Reengineering, to characterize the basic influences of the development of society, which bring changes in consumer behavior, bring new opportunities and challenges. These are: development and changes in technology, globalization, deregulation and privatization, customization, growing competition, industry integration, sales network transformation, disintermediation.

In the new economy, marketing shifts to the individual customer and focuses on building positive relationships. It uses new technologies, eg the Internet is an important tool of marketing communication and its growing potential for brand building is increasingly perceived. Another current trend is the public's orientation towards solving social issues. Companies are involved in socially beneficial projects and subsequent information about these activities to differentiate themselves from the competition and to strengthen the value of the brand. (Kotler, Kartajaya, H., Setiawan, 2016)

One transparent definition of marketing is Kotler's definition, which says that marketing means meeting needs with profit. (Kotler, 2007a). Kotler also more comprehensively defines marketing as a continuous process of analysis, planning, implementation and control. Its purpose is to create and maintain long-term relationships with target customers, which allow companies and other entities to achieve set goals (Kotler, 2004). Seth Godin says that marketing is the act of inventing the product, the effort of designing it, the craft of producing it, the art of pricing it, the technique of selling it. (Godin, 2010)

The brand is a frequent motive for research into consumer behavior and shopping. Research into consumer behavior, preferences and decision-making is one of the most dynamic areas of marketing and its development is influenced by both global changes and trends, as well as new research methods. The two most important global trends in consumer behavior are the aging population and the growing financial strength of women. In relation to this phenomenon, the question is how individual product categories will change across the segments with which brands women will age and what will be their

approach to communication messages. The issue of consumer behavior was addressed by Blackwell, Miniard, Engel, 2006., Shiffman, Kaňuk, 2004. who developed many approaches to the study of shopping behavior across segments, such as the generational approach (Musov, 2015)

Most companies generate their profits from long-term customers. It is generally known that on average 80% of a company's profit is generated by loyal customers. In addition, the value of satisfied and truly loyal (including emotionally engaged) customers grows as they transmit positive information to other people (Word of mouth). They can "pre-sell" goods. According to research, an company costs on average six times more to acquire a new customer than to retain an existing one. Customer loyalty is worth ten times the purchase itself. The probability of selling to an existing customer is approximately 70 to 80%, while the probability of selling to a new customer is only 5 - 20%. In practice, however, a large number of companies invest more and more money in acquiring new customers than in retaining existing ones, even though the market in the Czech Republic is relatively small and saturated. Many companies have not yet realized that customer loyalty is becoming an economic necessity. (Bárta, Pátík, Postler, 2009)

In order for a customer to become loyal, it is necessary to create a valuable emotionally based relationship with him. Customers need to know and feel the brand as an experience that helps them fulfill their individual wishes. Due to the ever-changing structure of the market and increasing competition, traders are beginning to be judged on their ability to build and maintain relationships with customers and strengthen their satisfaction and loyalty. According to De Pelsmacker, Geuens and Bergh, loyalty can be gained through a loyalty strategy. This strategy takes two forms. On the one hand, it is a strategy of reward, on the other hand, it is also a strategy of relationship (De Pelsmacker, Geuens, Van Den Bergh, 2003). The reward strategy strengthens customer loyalty through various benefits, such as loyalty bonus programs (for example, for airline passengers), shopping gifts, coupons, competitions, etc. This strategy is aimed at rational customers. However, it is very easily mimicked by competition and is, by no means, sufficient to maintain loyalty unless linked to a relationship strategy. Relationship strategy means building close relationships with customers based on detailed information that is intelligently applied to provide enjoyable, personalized, special benefits. The relationship-oriented strategy is designed for emotionally oriented customers. This makes it especially suitable for building customer loyalty.

The whole development of marketing communications in the developed economies of the world shows that the classical concept of marketing communication, which placed the greatest emphasis on mass advertising activities, reached its threshold of effectiveness. The dominance of advertising is gradually declining and there is a stronger integration of marketing communications (IMC). The main reasons for the promotion of IMC in recent decades were, among other things, the declining effectiveness of traditional tools, especially advertising (the phenomenon of advertising blindness, reduced trust and oversaturation of this type of communication in some media) and increased competition between media and the use of other well-targeted methods). In recent years, the view of the well-established communication mix, presented by the dominant advertising, has changed. Tiredness by commercials forced marketing managers to apply other tools of the marketing mix more. Marketers had to better understand and take advantage of each tool. Formerly marginal tools direct marketing, sponsorship, event marketing, online marketing are cutting an ever-increasing part of the pie of the marketing mix. Efforts to establish an active and long-term dialogue with the consumer are also becoming a priority. There is a greater fragmentation of the media and the market. Thus, the selectivity and targeting of communication towards different target groups becomes more important.

The American Association of Advertising Agencies uses the definition of IMC which says that it is a marketing communication planning concept that respects the new value created by a comprehensive plan based on understanding the

strategic roles of various communication disciplines such as general advertising, direct contact, sales promotion, and public relations. It combines them to produce maximum, clear and consistent impact (Duncan, Everett, 1993, 2000) IMK has subsequently been addressed by many authors who have shifted it in trends, such as Kotler, Keller, 2007, Kumar, 2008, Kotler, Kartajaya, H., Setiawan, 2016, Prikrylová, J. et al, 2019.

Therefore, if we define IMC as communication received from the customer's point of view, we can say that it is communication where the customer is offered resources, information, tools and media in a way that is valuable to him and gives him a good and quick understanding of the communicated message. We can say that if a customer is approached inconsistently, he is confused and unlikely to make a purchase. He further states that integrated marketing communications is a way of looking at the whole, of which we have seen only a part, such as advertising, public relations, sales promotion, purchasing, communication, etc., in a way that everything is perceived by the customer - as a flow of information from one source'. (De Pelsmacker, Geuens, Van Den Bergh, 2003)

Integrated marketing communications are also understood as a comprehensive process involving analysis, planning, implementation and control of all personal and impersonal communication, media, messages and sales support tools, which are focused on a selected target group of customers (Prikrylová et al., 2019). The goal of such a concept is to build a long-term relationship between buyer and seller by including a targeted individual in an interactive or two-way exchange of information. (Blakeman, 2018)

From the above, it can be concluded that nowadays, companies practicing integrated marketing communications try to link all the communication tools they use so that their effect is enhanced and the consumer has formed a strong bond with them.

2 Purpose and Methods of Research

The aim of the article is to define key changes in the strategies of companies and consumer behavior depending on COVID-19, which affect the current marketing communications and their tools.

The main research method we use is desk research. We are based on the already mentioned researches of the KANTAR CZ agency. The core of the scientific article is the analysis of the latest researches of the specialized agency KANTAR CZ and the determination of what changes in the strategies of companies and consumer behavior occurred during the COVID-19 pandemic. It is also possible to determine whether these can be considered permanent or temporary and also which factors, on the contrary, remained unchanged, even if their possible changes are discussed. The research part is based on a detailed analysis and synthesis of findings from these researches in order to define key changes in business strategies and consumer behavior as a result of COVID-19 and outline the current form of marketing communications and their tools.

3 Results

For the analysis of the findings in the strategies of companies and consumer behavior (consumer and shopping behavior) depending on COVID-19, we will use two specialized research agencies KANTAR CZ, one of which focuses on companies and strategies and the other focuses on consumers and their behavior. Following a synthesis of these findings, we define key changes in companies' strategies and consumer behavior that affect current marketing communications and their tools.

The first research we analyze is focused on companies and their strategies.

KANTAR CZ has been tracking consumer behaviours through the Covid-19 crisis since March 2020, providing impactful insights to its clients. This study is called COVID Barometer. As business sustainability matters, KANTAR CZ decided to

interview its client's to better understand the impact on their businesses and teams, thereby connecting the dots between its client's business strategy and its knowledge of consumer response to COVID-19.

The general indicators about research are: 40 companies in Czech Republic (68% multinational companies, 32% local companies).

The main objectives: foreseen business impact, concerns & scenario changes, public institutions, recovery.

The findings are following:

Over 80% of companies have already reported a negative financial impact on their business. The main concerns for businesses in the Czech Republic at his time are recession and possible financial issues.

In response, companies have had to consider and put into place various actions. They are increasingly focusing on e-commerce capabilities, pivoting their business or adapting production to new products that will fit the changed needs of their customers. They are also focusing on facilitating remote working and ensuring intensified hygiene in the workplace.

Two-thirds expect it will take up to 1 year to reach their pre-crisis performance once the Coronavirus crisis comes to an end. When it comes to financial support measures by the Czech public institutions, only 3% of companies view them as adequate. Three-thirds believe customers' habits and behaviours will change after the crisis and expect activities such as shopping, meetings and education to increasingly shift to online settings.

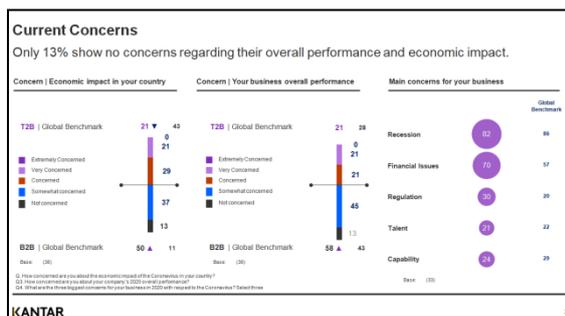
Over 60% perceive the role of Marketing Research as extremely important in strengthening their brand performance.

Global observations:

Globally 90 % of respondents believe there will be a change in expected consumer behaviour in the future. And yet nearly half will spend less on understanding how consumers are changing. Faced with a sudden downturn in their businesses and with concerns for the future, businesses are adopting recessionary behaviours. And given 64% expect their business to recover in 6-12 months; the plan appears to be to save their way of the crisis.

And yet, no recession has ever been accompanied by consumer change of this magnitude.

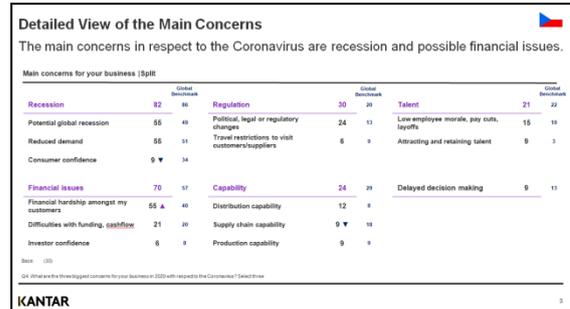
Businesses need to adapt to these changes. But in the face of cost cutting and a significantly constrained business environment, the ability to adapt is severely compromised. While these constraints will lead to more reactive/ responsive ways of working, the pandemic has acted as an accelerant for key trends which businesses can no longer ignore: Brand Purpose, Digital Transformation, and Organisational Performance.



Graph 1: Current concerns
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

One-fifth of companies claim to be very concerned about the economic impact of Coronavirus in the Czech Republic and about their overall performance. Only 13% show no concerns regarding their overall performance and economic impact.

Not only consumers are worried, 9 out of 10 Czech businesses have been impacted by the crisis. 4 out of 10 Czech businesses are concerned about their overall performance...one-fifth of companies claim to be very concerned about their overall performance. The Czech Republic is more positive than global benchmark and also among the most positive ones from CE region.

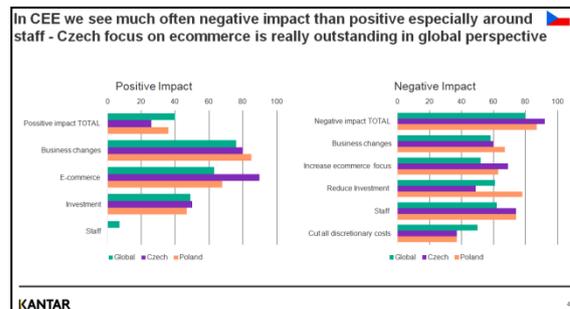


Graph 2: Detailed view of the Main Concerns
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

Main identified concerns are: recession, financial issues, regulation, capability, talent, delayed decision making. 3 out of 4 businesses are negatively impacted by the crisis.

Companies expect the situation to return to normal in the Czech Republic quicker than in other countries. At the same time, two-thirds expect it will take up to 1 year once the Coronavirus crisis ends to reach their pre-crisis performance.

71% of companies expect Global business practices to decrease as a long-term consequence of the crisis.

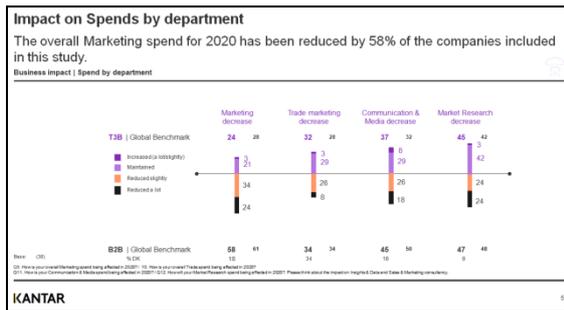


Graph 3: Impact
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

In CEE region we see much often negative impact than positive. Czech focus on ecommerce is really outstanding in global perspective.

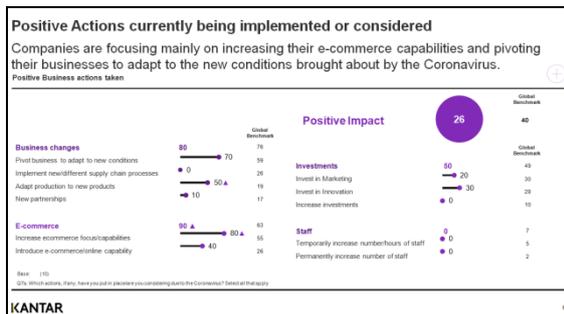
Faced with a sudden downturn and with concerns for the future, businesses are adopting recessionary behaviours. And yet 64% expect their business to recover in 6-12 months.

Czech companies are slightly more optimistic but still plan decrease in comparison with multinational companies. 74% believe there will be a change in expected consumer behaviours in the future. Everyday activities such as shopping, meetings or education are moving to online settings. 58% plan to spend less on marketing and 45% Communication & Media decrease.



Graph 4: Impact on Spends by department
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

The overall Marketing spends for 2020 has been reduced by 58% of the companies included in this study.



Graph 5: Positive actions
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

Companies are focusing mainly on increasing their e-commerce capabilities and pivoting their businesses to adapt to the new conditions brought about by the Coronavirus.

The second research we are now analyzing is focused on consumers and their behavior.

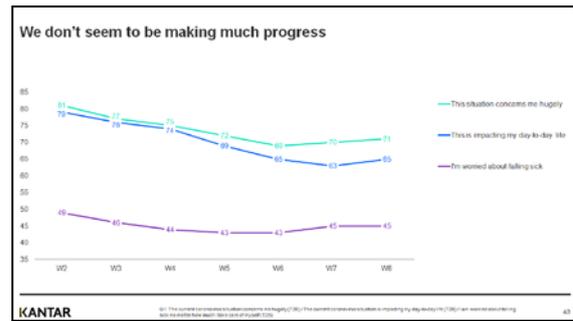
KANTAR CZ research description: Over the past 5 months the COVID19 Barometer has given a global view of how people are coping and changing during the pandemic.

The general indicators about research are: 140.000 interviews done in 6 waves (1st wave done end of March 2020).

The main objective of the study is to connect the impact of Covid-19 on changing consumer behaviour and attitudes to the impact on business, especially consumer attitudes, media habits, advertising, purchase behaviour, customer experience, looking forward.

The findings are following:

Consumers globally do not see any progress among the waves. Most of them say that the situation concerns them hugely. The second highest answer is that the situation is impacting the day to day life. The third highest answer is that consumer is worried about falling sick.



Graph 6: The concerns of the consumers due to COVID19.
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

We can find following key indicators which are important for defining the changes of marketing communication targets of companies:

Income impact widely felt 73% (either feel an impact on their income (53%) or expect to (20%)).

Younger age group (18-34) has been hardest hit, with 64% who felt the impact and 19% who expects to.

Employment impact felt 45% (17% reduced hours/ salary, 16% working as normal, but from home, 9% unemployed as a result of the pandemic, 4% furloughed).

A strong need for financial planning 60% of consumers (think the situation demands us to be more proactive about financial planning. This peaked in March 2020 (70%) and has been stable since June.).

Intention to save money intend 35% to focus on the future, by saving money and avoiding non-essential spend. Another 56% intend to find a balance. Only 9% intend to spend their money now.

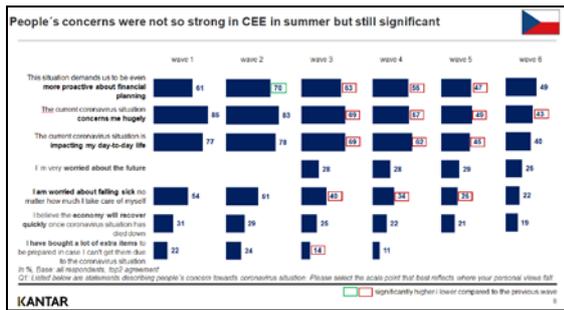
More than 70% of consumers pay attention to prices and 58% pay more attention to products on sale.

Intend to delay or stop considering 42% of people who had plans to make purchase in several consumer durables/service categories are now delaying (27%) or are no longer considering (15%) the purchase.

Travel and automotive sector are hit hard. Respectively 56% (travel) and 53% (automotive) are delaying or no longer considering purchases in the categories.

Nor are we considering new categories 9% had no plan to make a purchase but will now consider any of the products/services. The category most considered is insurance, with 10%.

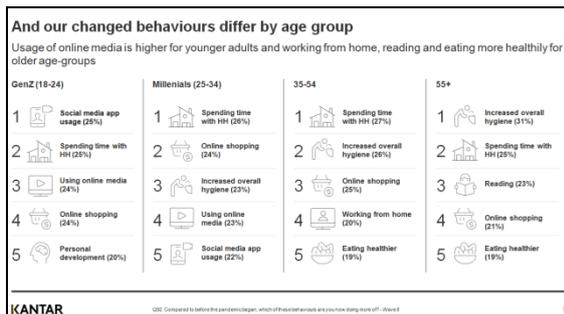
Recent investigation confirms how monetary attitudes have shifted across markets with the effect on new behaviours driven by COVID-19 - personal financial planning, desire to educate oneself about broader financial planning and investing, moderation and judiciousness on the rise, bringing peace of mind and security, life goes on without many excesses, reprioritization of essentials; decrease in consumption joy, finding ways to save in the everyday.



Graph 7: Main concerns due to COVID-19
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

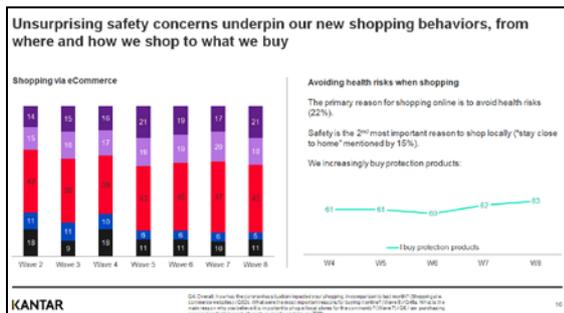
In impact on employment we can see following trends (in order of the frequency of answers): I am working totally as normal (38%), I am working as normal, but from home (11%), I am working reduced hours/reduced salary (9%), I have become unemployed (4%), I have been furloughed (3%), other (35%).

The trends in money spend after lockdown are following (in order of the frequency of answers): I intend to have a balance, by spending some of my money now while also considering the future (58%), I intend to focus on the future, by saving money and avoiding non-essential spend (35%), I intend to spend my money now rather than think about the future, as it is quite uncertain (7%). The importance of health and safety has great influence on customers' behaviour. Here we can see the most important changes by age-groups:

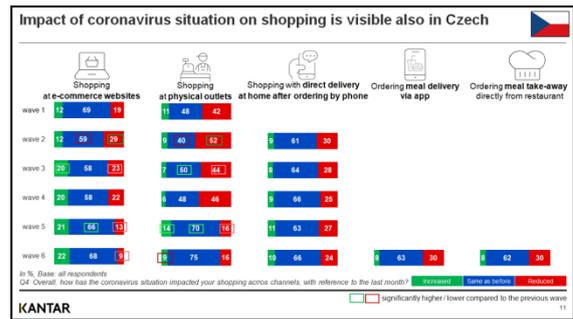


Graph 8: Changes in behaviours by age-groups
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

There is no surprise that defined changes have the influence on new shopping behaviours, from where and how we shop to what we buy:

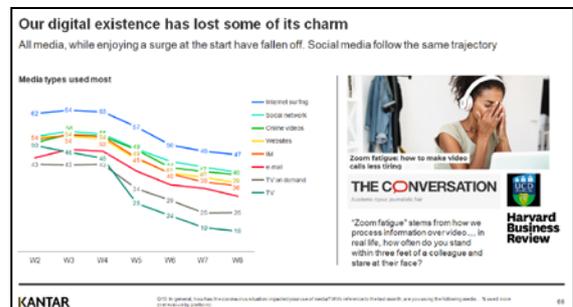


Graph 9: Changes in shopping behaviors
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval



Graph 10: Types of shopping
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

It is very important to know the trends of changes and development in media consumption because it has great influence on marketing communication strategies and tools. The actual trends in media consumption are following:



Graph 11: Media consumption trends
Source: KANTAR CZ (www.kantar.com), internal materials, published with approval

We anticipate some changes to our habits and behaviours after the crisis. 63% thinks consumer habits and behaviours will change, 22% thinks it won't change and 15% doesn't know. The younger we are, the more likely we're to think consumer habits will change after the crisis (age 18 - 34 69%, age 35 - 43 65%, age 55+ 48%). Expected return to pre-coronavirus pandemic habits. Most of my behaviours will go back to what they were before lockdown 49%, I will go wherever I want to go and I will do whatever I want to do.. 48%.

Localism, a rising trend for a long time, has received a boost during the pandemic. There is increased attention to product origin - 52% pays more attention to the products origin. We are supporting local shops - 69% think local shops are important for the community. Key reasons are: supporting the local economy (28%) and safety concern around staying close to home (15%).

4 Conclusions

Through the analyses of KANTAR researches, we have identified the following key facts in company strategies and consumer behaviour which affect current marketing communications and their tools.

Over 80% of companies have already reported a negative financial impact on their business. The main concerns for businesses in the Czech Republic at his time are recession and possible financial issues. In response, companies have had to consider and put into place various actions. They are increasingly focusing on e-commerce capabilities, pivoting their business or adapting production to new products that will fit the changed needs of their customers. Three-thirds believe customers' habits and behaviours will change after the crisis and expect activities such as shopping, meetings and education to increasingly shift to online settings. Faced with a sudden downturn in their businesses and with concerns for the future,

businesses are adopting recessionary behaviours. 64% expect their business to recover in 6-12 months.

9 out of 10 Czech businesses have been impacted by the crisis. 4 out of 10 Czech businesses are concerned about their overall performance. Main identified concerns are: recession, financial issues, regulation, capability, talent, delayed decision making. Czech companies are slightly more optimistic but still plan decrease in comparison with multinational companies. 74% believe there will be a change in expected consumer behaviours in the future. Everyday activities such as shopping, meetings or education are moving to online settings. 58% plan to spend less on marketing and 45% Communication & Media decrease.

We can find following key indicators which are important for defining the changes of marketing communication targets of companies: A strong need for financial planning 60% of consumers (think the situation demands us to be more proactive about financial planning. This peaked in March 2020 (70%) and has been stable since June.). Intention to save money intend 35% to focus on the future, by saving money and avoiding non-essential spend. Another 56% intend to find a balance. Only 9% intend to spend their money now. More than 70% of consumers pay attention to prices and 58% pay more attention to products on sale. Intend to delay or stop considering 42% of people who had plans to make purchase in several consumer durables/service categories are now delaying (27%) or are no longer considering (15%) the purchase. Nor are we considering new categories 9% had no plan to make a purchase but will now consider any of the products/services. The category most considered is insurance, with 10%. Recent investigation of KANTAR CZ confirms how monetary attitudes have shifted across markets with the effect on new behaviours driven by COVID-19. We anticipate some changes to their habits and behaviours after the crisis. 63% thinks consumer habits and behaviours will change, 22% thinks it won't change and 15% doesn't know. The younger we are, the more likely we're to think consumer habits will change after the crisis (age 18 - 34 69%, age 35 - 43 65%, age 55+ 48%). Localism, a rising trend for a long time, has received a boost during the pandemic. There is increased attention to product origin - 52% pays more attention to the products origin.

These findings and the resulting changes, whether permanent or temporary, affect current marketing communications and their tools.

In general, we talk about the so-called tools of marketing communications of the 21st century. With the overall situation, we encounter a significant increase in online marketing communications tools, where the Internet and online as such occupies an important position in the strategies of companies and consumer behavior. The Internet is a medium that can instantly provide information about the effectiveness of an advertising format, and it is also easy to measure where a company gets the most visitors to its website.

Online marketing tools are chosen according to what goals the company wants to achieve. If it wants to promote the brand, it can use, for example, banner advertising (it is, more suitable for campaigns focused on brand image. Creativity plays an important role here. The importance of banners decreases with the price, but they still have their place, as in the case of targeting viral campaigns (rapid and cheap dissemination of the message is mainly possible by e-mail. In particular, people forward messages that are interesting, funny, parodying or with other motives. Loss of control over the problem can be a problem). brand awareness, uncontrolled dissemination, poorly detectable response or the threat of spamming), community building, microsites, online PR, advergames. When setting a goal that is focused on performance, it is appropriate to use, for example, search engine marketing (divided into two groups: unpaid search results and paid search results. Search engine marketing is an important tool of Internet marketing today. The goal is to ensure the visibility of the site in the advantage is that the company pays only for the brought visitor), e-mailing campaigns, affiliate marketing (this is a tool where there is a

division of income between online merchants who draw attention to each other's offers. For owners online stores are the most cost-effective tool (they pay a commission for realized sales, not only for displaying an advertisement or bringing a visitor).

Other tools used in online marketing are viral marketing and content marketing.

Viral marketing - the advertising message spreads so-called "self": users voluntarily pass it on without further intervention and control by the client or initiator. Creatively, this method is very demanding. The basic feature is therefore usually low cost, but without the possibility of controlling the dissemination, later modification of content, number or other specifications.

Content marketing - content marketing mainly involves creating stories for companies and individual products - these stories are then part of all communication and are a prerequisite for the application of other new trends, such as buzz marketing. This type of company or product strategy is not primarily focused on sales, but to communicate with existing and potential customers. Despite the importance of online marketing, however, the company cannot completely eliminate other tools within its marketing communications mix and focus only on the Internet.

In addition to the already well-known tools of the "classic" communication mix, we currently encounter tools that are based on general market, consumer and technology developments and are further enhanced by COVID-19, where one of the main goals is efficiency. These tools do not replace the traditional ones, but complement and combine them appropriately. It is worth mentioning in particular:

Mobile marketing - mobile marketing is marketing using mobile phones (or their services) and other mobile devices, which can include GPS navigation. It is worth mentioning especially the area of mobile applications and LBS (location based services), which can be very well used for immediate motivation to visit the point of sale and purchase.

Word-of-Mouth marketing - is part of the so-called BUZZ marketing = it is about creating excitement and debates about a topic, brand or product - between consumers and the media. It is a very effective tool without significant investment. In essence, it includes viral marketing, blogs, communities, loyalty programs, and other techniques that support discussions about a particular brand or its products. It can be part of the marketing mix of a completely new brand, but more often we meet it with established and well-known products.

Guerrilla communication - the goal is to attract attention in any way - mostly in a non-traditional way, in the form of hidden cameras or activities on the border of the law or local regulations. It is therefore a style of communication that usually does not use traditional media, or uses them untraditionally. The most common scenario is to strike in an unexpected place in an unexpected way, focus on the selected targets and quickly pull back. Immediate publicity is expected, which will guarantee the maximum effect of the campaign with minimum costs.

Product placement - placement of an advertisement or product in a film or other work. It is suitable for brand advertising, where the promoted product, service or brand forms part of the story. PP is used primarily to increase brand awareness and long-term product visibility.

Neuromarketing - finds differences between the customer's conscious statement and subconscious behavior. Neuromarketing is then the application of this knowledge to any area of marketing: packaging, research and development, marketing communication, creation of communication concepts, etc.

One of very significant examples how IMC reflects also technological development is artificial intelligence. These applications perform repetitive, structured tasks that require

relatively low levels of intelligence. They're designed to follow a set of rules or execute a predetermined sequence of operations based on a given input, but they can't handle complex problems such as nuanced customer requests. An example would be a system that automatically sends a welcome email to each new customer. Simpler chatbots, such as those available through Facebook Messenger and other social media providers, also fall into this category. They can provide some help to customers during basic interactions, taking customers down a defined decision tree, but they can't discern customers' intent, offer customized responses, or learn from interactions over time. Embedded within existing systems, these AI applications are often less visible than stand-alone ones to the customers, marketers, and salespeople who use them. For example, machine learning that makes split-second decisions about which digital ads to offer users is built into platforms that handle the entire process of buying and placing ads. Netflix's integrated machine learning has offered customers video recommendations for more than a decade; its selections simply appear in the menu of offerings viewers see when they go to the site. If the recommendation engine were stand-alone, they would need to go to a dedicated app and request suggestions. As companies become more sophisticated in their use of marketing AI, many fully automate certain types of decisions, taking humans out of the loop entirely. With repetitive, high-speed decisions, such as those required for programmatic ad buying (where digital ads are served up almost instantaneously to users), this approach is essential. In other domains AI may only present recommendations to a person faced with a choice—for example, suggesting a movie to a consumer or a strategy to a marketing executive. Human decision-making is typically reserved for the most consequential questions, such as whether to continue a campaign or to approve an expensive TV ad. Firms should move to more-automated decisions whenever possible. We believe this is where the greatest returns from marketing AI will be found. (Davenport, Guha, Grewal, July-August 2021)

Like marketing, marketing communications are a dynamic field that reflects market developments, consumers, technology developments and other key factors. Each of the tools of the marketing communication mix has its specific function and fulfills different goals. It is therefore necessary to take into account whether it builds awareness, whether it informs, whether it pushes or pulls, or whether the company just wants to maximize sales and other goals. As we have already mentioned, the key goal is efficiency, both in the qualitative level (awareness, brand knowledge) and in the quantitative level (sales). However, in particular, efficiency must currently be seen in the ratio of cost versus income (cost per addressed consumer, cost per product sold, return on investment and others). In this article, we mentioned integrated marketing communications as a model that combines both classic and modern tools of marketing communications. It can be said with almost certainty that the integration of marketing communications tools will continue, with a reflection on key changes in company strategies and changes in consumer behavior.

Acknowledgement

Authors want to thank the research agency KANTAR CZ (www.kantar.com) and namely Petra Průšová (CEO for Central and Eastern Europe) for their helpfulness, professional consultations and the provision of a number of internal researches, on the basis of which the key findings of this article were determined.

Literature

1. Armonienė, A.: *Integruota komunikacija: dinamiška modelis*. In *Informacijos mokslai*, 2001. Vol. 19. pp. 70–83.
2. Bárta, V., Pátík, L., Postler, M.: *Retail marketing*. Praha: Management Press, 2009, 328 p. ISBN 978-80-7261-207-9. pp. 41-45
3. Bártovej, H., Bárta, V., Koudelka, J.: *Spotřebitel (chování spotřebitele a jeho výzkum)*. Praha, VŠE - Oeconomica, 2007. 254 p. ISBN 978-80-245-1275-4

4. Blackwell, R., Miniard, P., Engel, J.: *Consumer behavior*. Ohio: Thomson South - Western, 2006. 774 p. ISBN 0-324-27197-2
5. Blakeman, R.: *Integrated marketing communication: creative strategy from idea to implementation*. Third edition. Lanham: Rowman & Littlefield, 2018. 368 p. ISBN 978-1-5381-0105-6 – pp 4
6. Davenport, T. H., Guha, A., Grewal: *How to Design an AI Marketing Strategy*. Harvard Business Review, July-August 2021, ISSN 0017-8012
7. De Pelsmacker, P. et al.: *Marketingová komunikace*. Praha: Grada Publishing, 2003. 584 p. ISBN 802-470-2541. pp. 29-32
8. De Pelsmacker, P., Geuens, M., Van Den Bergh, J.: *Marketing Communications: A European Perspective*. 2013. 615 p. Harlow: Pearson Education Limited. ISBN 978-0-273-77322-1.
9. Duncan, Th.R., Everett, S.E.: *Client perceptions of integrated marketing communications*. Journal of Advertising Research. 1993. Vol. 33 Issue 3, pp 30-39
10. Foret, M.: *Marketingová komunikace*. Brno: Computer Press, 2011, 488 p. ISBN 978-80-251-3432-0
11. Frey, P.: *Marketingová komunikace: nové trendy 3.0*. Praha: Management Press, 2011. 212 p. ISBN 978-80-7261-237-6.
12. Godin, S.: *Fialová kráva: marketing konečně jinak! = Purple cow : transform your business by being remarkable*. Praha: Fragment, 2010. 180 p. ISBN 978-80-253-1120-2. pp. 97
13. Hammer, M., Champy, J.: *Reengineering - radikální proměna firmy: manifest revoluce v podnikání*. Praha: Management Press, 2000. 212 p. ISBN 80-7261-028-7
14. Hanzelková, A et al.: *Strategický marketing: teorie pro praxi*. Praha: C. H. Beck, 2009. 170 p. ISBN 978-807-400-1208
15. Horská, E.: *Spotřebitel na trhu*. In Slovenský výber, roč. 5, 2001, č. 12, pp. 28 -29. ISSN 1335-9266.
16. Jánošová, D.: *Regional marketing from the view of selected factors : scientific monography* 1. vyd. - Katowice : Wydawnictwo UNIKAT 2, 2017. - 119 p. - ISBN 978-83-62314-29-4.
17. Jakubíková, D.: *Strategický marketing*. Praha: Grada Publishing, 2007. 368 s. ISBN 978-802-474-6708
18. Jakubíková, D.: *Strategický marketing: strategie a trendy*. 2., rozš. vyd. Praha: Grada. Expert (Grada), 2013. 362 p. ISBN 978-80-247-4670-8.
19. Karliček, M. et al.: *Základy marketingu*. 2. edition. Praha: Grada. 2018. 288 p. ISBN 978-80-247-5869-5.
20. Karliček, M.: *Marketingová komunikace: jak komunikovat na našem trhu*. Praha: Grada Publishing, 2016. 224 p. ISBN 978-80-247-5769-8
21. Keller, K. L.: *Strategické řízení značky*. Praha: Grada Publishing, 2007. 800 p. ISBN 802-471-4813
22. Kotler, P., Keller, K.L.: *Marketing Management*. Praha: Grada Publishing, 2007b. 792 p. ISBN 802-471-3595
23. Kotler, P., Keller, K.L.: *Marketing management*. 12. vyd. Praha: Grada, 2007a. 816 p., ISBN 978-80-247-1359-5. pp. 42
24. Kotler, P., Wong, V., Saunders, J., Armstrong, G. et al.: *Moderní marketing*. Praha: Grada Publishing, 2007. 1041 p. ISBN 802-471-5452
25. Kotler, M., Kotler, P.: *8 strategií růstu: Jak ovládnout trh*. Brno: Bizbooks, 2013. 208 p. ISBN 978-802-6500-766
26. Kotler, Ph., Kartajaya, H., Setiawan, I.: *Marketing 4.0: Moving from Traditional to Digital*. John Wiley and Sons, 2016. 208 p. ISBN 978-111 9341208
27. Kotler, P., Armstrong, G.: *Principles of Marketing*. Harlow: Pearson Education Limited; 17th edition. 2018. 736 p. ISBN-13: 978-0134492513. ISBN-10: 013449251X
28. Kotler, P., Armstrong, G.: *Marketing*. Praha: Grada, 2004, 864 p. ISBN 978-80-247-0513-3. pp. 43
29. Koudelka, J.: *Spotřební chování a segmentace trhu*. Praha: Vysoká škola ekonomie a managementu, 2006. 227 p. ISBN 808673001-8
30. Koudelka, J.: *Segmentujeme spotřební trhy*. 1. edition. Kamil Mařík - Professional Publishing, 2005. 145 p. ISBN 80-86419-76-2.
31. Krajčovič, P., Urmínová, M.: *Media in the time of the pandemic*. In: Marketing identity COVID-2.0 : conference proceedings from the annual international scientific conference. 1. vyd. - Trnava : FMK UCM, 2020. s. 290-299 [online]. ISBN 978-80-572-0107-6 (online). - ISSN 2729-7527 (online)

32. Kumar, N.: *Marketing jako strategie vedoucí k úspěchu*. Praha: Grada Publishing, 2008. 240 p. ISBN 802-472-4393
33. Labudová, L., Jánošová, D.: *Analysis of support and identification of barriers to SMEs in Slovakia and in the Czech Republic, 2019*. DOI DOI 10.5937/sjm14-23494. In: *Serbian Journal of Management: an International Journal for Theory and Practice of Management Science*. - ISSN 1452-4864, Roč. 14, č. 2 (2019), p. 437-453.
34. Mulačová, V., Mulač, P.: *Obchodní podnikání v 21. století*. Praha: Grada Publishing, 2013. 520 p. ISBN 978-802-474-7804
35. Mullins, J.W., Walker, O.C.: *Marketing management: A strategic decision-making approach*. Eighth Edition. New York: McGraw-Hill. 2013. 576 p. ISBN 978-0-07-132637-7.
36. Musová, Z.: *Responsible behaviour of businesses and its impact on consumer behaviour*. In: *Acta Oeconomica Universitatis Selye* 2015.4 (2), pp. 138 – 147 - ISSN 1338-6581
37. Parente, D. E., Strausbaugh-Hutchinson, K.L.: *Advertising campaign strategy: a guide to marketing communication plans*. Fifth Edition. Boston: Cengage Learning. 2015. 432 p. ISBN 978-1-133-43480-1.
38. Peter, J. P., Olson, J. C.: *Consumer behavior & marketing strategy*. Ninth Edition. New York: McGraw-Hill. 2010. 576 p. ISBN 978-0-07-126781-6.
39. Příkrylová, J. et al.: *Moderní marketingová komunikace*. Praha: Grada Publishing, 2019. 344 p. ISBN 978-802-710-7872. pp. 53-54
40. Soyer, M., and Dittrich, K. 2020. *Sustainable consumer behaviour in purchasing, using and disposing of clothes*. Available online: https://www.researchgate.net/publication/341709923_Sustainable_consumer_behaviour_in_purchasing_using_and_disposing_of_clothes. (accessed on 28 October 2020).
41. Solomon, M. a kol.: *An European Consumer*. Third edition, New Jersey, USA : A Simon and Schuster Company, 2006. 701 p. ISBN 13-978-0273-68752-2
42. Shiffman, L., Kanuk, L.: *Nákupní chování*. Brno: Computer Press, 2004. 633 p. ISBN 80-251-0094-4
43. Světlík, J.: *Marketingové komunikace*. Ostrava: VŠPP, a. s., 2016. 180 p. ISBN 978-880-6847-79-5
44. Světlík, J.: *Marketing cesta k trhu*. Plzeň: Aleš Čeněk, 2005. 344 p. ISBN: 80-86898-48-2.
45. Vašítková, M.: *Marketing služeb: efektivně a moderně*. 2nd updated and extended edition. Praha: GRADA Publishing a. s., 2014, 269 p. ISBN 978-80-247-5037-8
46. www.forbes.cz (online) <https://www.forbes.sk/aprilovy-forbes-je-o-uspesnom-podnikani-aj-o-lekciach-z-roku-pandemie/>
47. Winer, R. S., Dhar R.: *Marketing management*. Fourth edition. New Jersey: Pearson. 2011. 528 p. ISBN 978-0-13-038792-9.
48. Zamazalová, M.: *Marketing obchodní firmy*. 1 vyd. Praha: Grada, 2009. 240 p. ISBN 978-80-247-2049-4.
49. Zuzák, R.: *Strategické řízení podniku*. Praha: Grada Publishing, 2011. 176 p. ISBN 978-80-247-4008-9

Primary Paper Section: A

Secondary Paper Section: AJ, AE

TEACHING DURING THE PANDEMIC IN HIGHER EDUCATION: AN ONLINE DRAMA COURSE FOR TEACHER TRAINEES OF ENGLISH AS A FOREIGN LANGUAGE

^aANDREA PUSKÁS

*J. Selye University, Faculty of Education, Bratislavská cesta
3322, 945 01 Komárno, Slovakia
email: "puskasa@ujss.sk"*

Acknowledgement: The research for this paper was done within the framework of the KEGA grant project "Improving creativity and teaching English as a foreign language creatively at primary and secondary schools", project no. 006UJS-4/2019 at the J. Selye University, Faculty of Education.

Abstract: The paper focuses on the components of successful online learning and teaching environments. By following a socio-cultural perspective on learning, the author underlines the importance of teacher-student and student-student interaction and the role of small groups in efficient online learning. The paper presents the findings of a case study investigating how a previously offline university bachelor course, Drama Techniques in Teaching English as a Foreign Language I, was transformed to virtual space during the lockdown period in Slovakia in the winter term of the 2020/2021 academic year, at the J. Selye University, Faculty of Education, Komárno.

Keywords: online teaching, online environment, interaction, drama techniques, higher education, non-native EFL teacher trainees.

1 Introduction

2020 was the year when the virtual and the real world in education intertwined in the phenomenon known as teaching online. Even in 2000, not many teachers knew what teaching online meant and only a few educators were familiar with the basic techniques of online teaching or knew much about video conferencing platforms. While many teachers have taken the plunge since then (Hašková-Šafranko-Pavlíková-Petrikovičová 2020), many of them still have some basic questions about online teaching and still find themselves challenged by the special demands of online teaching. The year 2020 forced educators to implement online teaching and left them no other choice. Educators, instructors, primary, secondary school teachers as well as lecturers, instructors and tutors in higher education started to explore the world of online teaching for the first time and the measures taken and decisions made were based more on improvisation and hasty choices, rather than on experience and deliberate planning.

When discussing teaching and learning during the pandemic and lockdown, more emphasis was given to learning, since it was not only students but also teachers and educators who had to overcome their anxieties about the use of ICT and learn about ways of teaching online. They had to gain new skills – many educators lacked previously – and design learning materials and come up with ways of learning and teaching that fit the demands of an online learning and teaching environment.

The aim of the present paper is to investigate the key features of successful online courses in higher education with special attention to the concepts, approaches and tools of online learning environments. The paper presents the findings of a case study investigating a university bachelor course Drama Techniques in Teaching English as a Foreign Language I. in the winter term of the 2020/2021 academic year at J. Selye University, Faculty of Education, Department of English Language and Literature. The major aim when transforming the course to online space was to maintain student engagement, foster interaction and keep down drop-out rates in order to make online learning effective.

2 Online courses in higher education

Universities rarely offered online courses before the COVID-19 pandemic in Central Europe. Of course, there were several attempts to implement new technologies in training programmes and to redefine traditional education (Bernátová-Bernát-Poráčková-Nagy 2020) and attempts to make teaching and learning more updated to live up to the technological expectations of the twenty-first century. Already during the

decade before the outbreak of the pandemic in 2020 in Central Europe, there were serious shifts in the priorities and principles higher education courses followed. Abandoning the mere transmission of knowledge, more and more instructors designed courses that aimed at improving creativity and critical thinking (Zahatňanská-Nagy 2020) and developing competences such as the understanding of causality and logical argumentation (Bernátová-Bernát-Poráčková-Nagy-Sedlák-Sepešiová-Vadašová 2019) and built on the interaction of members of smaller learning communities or units. However, there are not many concrete examples of higher education courses in Slovakia which were offered merely online.

Correspondence learning or distance learning were quite common in higher education, however they always included face-to-face sessions, traditional teaching, learners had to attend classes during weekends or at set times. It is true that more and more faculties tried to adjust the traditional term to individual needs, for example by offering learners flexible study plans, where attendance of courses in the traditional classroom environment is not required on a regular bases and communication with the instructor can take place via online tools.

During the pandemic, all universities in Slovakia were forced to shift courses in all disciplines to online space, for the first time in March 2020, until the very end of the spring term. Though universities were allowed to open and start traditional teaching and learning, they were closed again due to the general lockdown in October 2020. Although much has been learnt from the practices and solutions of the first lockdown period in spring, even after the experiences of the second term in the lockdown period many aspects of online teaching are currently under study and are examined from various aspects with issues that still need to be tackled by academics and educators. Instructors have been experimenting with online solutions and practices and many times it is the mistakes they make that become their major teachers. Consultations with other instructors, sharing experience, finding online trainings and resources while teaching online can be beneficial, however, there is no manual for online teaching in higher education which would work with all courses and audiences, each situation is different, the goals and nature of courses, learners' needs, access to online tools, personalities as well as the teacher's skills and competences all contribute to the success of online courses.

The transition to online teaching during the first and the second major lockdown in higher education in Slovakia in 2020 has had an increasing influence on the understanding of the forms and the tools of higher education. In addition to the pandemic, of course, there had been several other drivers to online teaching and learning in higher education, not only technological changes and improvement, but also the need for establishing cooperation with other institutions on a global scale, the wish for easily accessible and available information and resources or the changing lifestyles and needs of students. University education has always requested independence, self-regulated learning and the maximum of freedom from the side of students, and materials and resources available online can help students in achieving success.

Online teaching and learning needs to follow many of the principles of course design applied in face-to-face teaching and learning, for example keeping in mind the major goals of the course, the analysis of detailed components and stages, design needs to consider how to achieve good learning interaction, selecting materials and making decisions about content (Bach-Haynes-Smith 2007). On the other hand, online learning is definitely changing policies and practices in higher education, since some of the major forms and methods of teaching in higher education have been challenged. Lectures are supposed to be the typical feature of higher education across the world. A good

lecturer inspires learners, promotes self-directed learning, has sophisticated social and presentation skills (Bach-Haynes-Smith 2007), however, during a traditional lecture there is no or little opportunity for engagement and interaction between the lecturer and the students. During online teaching, the role of the instructor to involve students and engage them in order not to lose them during the course and to find ways of connecting to the students became one of the most important priorities. With the involvement of technology and online tools, both students and instructors found out that lectures can be delivered in either a synchronous (online discussion that happens at the same point of time) or an asynchronous way (online discussion that does not all happen at the same point in time, but learners can visit the text-based discussion at different times within a defined period) (Bach-Haynes-Smith 2007: 131-132). It is not only this time shift that influences the judgement or the relevance of lecturing in higher education, but also the fact that during online teaching instructors have identified the benefits of small groups even to a larger extent than before and have taken a sociocultural perspective on learning by finding out how dialogue, interaction and high learner engagement play an important role in the process of learning. Certain scholars even emphasize the influence of sociocultural approaches to learning on learner identity and the interplay between language, culture and identity (Marosi 2019).

3 Designing an online learning environment

Boettcher and Conrad (2010) list four types of courses: (1) traditional face-to-face, (2) Web facilitated, (3) blended/hybrid and (4) online courses. Traditional courses are the ones where no online technology is used, the content is delivered in a written or oral form. Web facilitated courses use Web-based technology to post the syllabus, assignments and other types of course content. Blended or hybrid courses blend online and face-to-face teaching. A certain proportion of the content is delivered online, but it also uses face-to-face meetings as well as online discussions. Online courses, however, deliver course content exclusively in an online environment, there are no face-to-face meetings. (Boettcher – Conrad 2010: 9).

Transforming a course which has been taught face-to-face for years into an online course is great challenge even for more experienced educators. One of the biggest mistakes that can be made is putting all lecture material online, making it available in an online space without involving learners in online interactive activities.

If the course is designed for the first time and the instructor intends to start an online course because of own initiative, major decisions can be made voluntarily and freely. However, when courses need to be moved online because of external circumstances – for example due to the Covid-19 pandemic, it is more difficult to disregard previous practices and solutions that were successful in the classroom. It is more effective to approach the course as if it was taught for the first time in order to find the best online tools and solutions in the online environment, of course rather than trying to push the same approaches and tasks in online space and stick to solutions which worked in traditional teaching.

3.1 Pedagogical approaches to teaching online

In order to deliver an online course successfully, the right pedagogical approach and strategies must be selected. When a course is shifted to virtual space, the methods and approaches previously applied by the instructor must be reconsidered, since the methods which worked well in a traditional course, do not necessarily match with the requirements and circumstances of online courses.

Effective online courses involve interaction, interpersonal connections, the sense of 'connectedness', promote learner autonomy and are the engines of further, self-regulated learning. Regular interaction is also necessary to avoid high drop-out rates and learner isolation. Interaction can occur in several ways.

Thereby this specific process "enter the cultural and literary context of intellectual spaces and apertures for written patterns of the past, creative activities of the present, and plans for the future. This view is extremely important and useful in the educational process itself" (Senkar 2019: 98).

Sociocultural theories of learning and teaching emphasize that learning is a social event and requires the interaction of several individuals, teachers, students, classmates, group-members (see e.g. Dawley 2007, Meskill 2013). The social experience is essential for learning. It is the connection between learners, the driving force that can even have an influence on motivation (Abrami et al. 1995, von de Water et al 2015). Katherine McWhaw et al. (2003) underline the importance of 'positive interdependence' and the effects of belonging to a group. They even link the social aspects of learning with learners' autonomy or independent learning. They claim that the sense of trustworthiness promote learning, develop social skills and support self-regulated learning. They argue: "(...) successful learners are motivationally, cognitively and behaviourally active participants in their own learning" (McWham et al. 2003: 81-82). They also add that it even works the other way round, which means that successful learners should take responsibility for their learning "such as those encountered in collaborative learning environments" (McWham et al. 2003: 83).

Martin Weller explains that one of the most dominant approaches in online courses is constructivism, which is heavily influenced by the work of psychologist Jerome Bruner. Weller claims that the philosophy behind constructivism is that learners construct their knowledge, solutions, interpretations to problems and ideas, based on their experience and relationship with concepts, through dialogue with other learners and the teacher (Weller 2005). This means that an online course based on a constructivist approach involves structured discussion, group work, collaboration, problem-solving and the role of the teacher is changed from a controller, leader to the role of a facilitator encouraging, helping, and assisting the learning process. Weller describes the following approaches to online learning: (1) resource-based learning, (2) collaborative learning, (3) problem-based learning, (4) narrative-based teaching, (5) situated learning.

Out of the above list, resource-based learning, collaborative learning and problem-based learning should be paid special attention when designing online courses, since they have a great potential in maintaining student-student and student-teacher interaction and open up more space for learner involvement. In fact, the three approaches to online teaching and learning can be used in combination, they share several similarities and all of them can be viewed as examples of the constructivist approach to online teaching. In a resource-based approach, learners must solve a problem or produce an output with the help of several resources, for example access to a database of articles, or a collection of resources on CD (Weller 2005: 67-68). This approach also involves making learners not only involved in but also responsible for their own learning process. They have to look for new resources and judge whether what they have found is relevant to the task they have been given. Learners are also provided with resources and guidance from the teacher, however, they have to complete the task on their own or by collaborating with another learner.

Collaborative learning is very much involved in almost all approaches to online teaching and learning emphasising the importance of interaction and the idea of the social learner. It involves giving tasks to learners that need to be completed in a group or in a team. Learners learn to communicate with each other and get feedback on their ideas or work from other group members, which may help them reflect on their own work. Working in a group or team face-to-face in traditional teaching and working in a group in online courses definitely have similarities, however, the latter raises some additional issues or principles that need to be kept in mind. Group members need to have the same access both to video-conferencing platforms (if the group decides to have regular meetings online) and to online

materials necessary for completing the task. Learners should also be given guidance on how to carry out tasks online with their group members (which online tools are appropriate) and what the particular individual contribution of each group member should be.

Similarly to resource-based and collaborative learning, problem-based learning is centred on increased learner responsibility and involvement in the learning process. Learners are expected to solve a given problem by collecting information, gaining knowledge and investigating several practices and ideas. Learners need to focus on the context in which the problem occurs and they need to find relevant solutions. Based on this approach, learners participate in meaningful tasks. In an online environment, problem-solving learning must go hand-in-hand with careful teacher guidance and constant support.

Selecting an appropriate pedagogical approach to online teaching is also determined by the availability of technological tools, since the latter determines the former to a great extent.

Moving to online space can also be understood as getting rid of the borderlines and limitations of physical space. It is very similar to the way Senkar describes the disappearance of borderlines between cultures and nations in literature: “also those elements of the exosphere had been incorporated into the literary devices (e.g. poems), which appeared in communication practice of the homeland after disappearance of physical borders of the countries. Because of this aspect, the current borders (external, internal) of the language have a heterogeneous character” (Senkar 2019: 259).

3.2 Choosing technological tools

Selecting technological tools for the online course is one of the greatest challenges for the instructor. There is no technology that would replace face-to-face contact or which would satisfy all learner needs, learning styles or all course objectives. However, the right choice of the online learning environment and online tools has a significant impact on learning efficiency, which can be further improved by using a variety of online tools.

Don Olcott (1999) lists what he calls the five “I’s” of effective distance teaching:

- Interaction – it refers not only to the communication between the student and the teacher and between a student with other students but also means the interaction between the student and the content of the course. (Olcott 1999, cited in: Palloff – Pratt 2001: 52)
- Introspection – students need practical examples where they can apply their understanding of the content. This can be encouraged by discussion boards, graphics, audio and video technologies (Olcott 1999, cited in: Palloff – Pratt 2001: 52)
- Innovation – experimenting with new technologies to satisfy the needs of various learning styles (Olcott 1999, cited in: Palloff – Pratt 2001: 52)
- Integration – refers to the integration of facts, concepts, theories, and practical application of knowledge. This can be carried out for example by case studies, print exercises or role-play (Olcott 1999, cited in: Palloff – Pratt 2001: 52-53)
- Information – refers to the knowledge and understanding that students need to acquire in order to move to the next level of learning (Olcott 1999, cited in: Palloff – Pratt 2001: 53).

Lisa Dawley (2007) underlines that effective online courses involve feedback, interaction and content, promote self-learning and pay attention to learning styles (Dawley 2007: 5). The most important components of any online course are student-student interaction, teacher-student interaction, learners’ independent work and available online materials.

Practical tips for instructors when designing an online course:

- Set clear course objectives, formulate what a successful learner will be able to do and which skills and knowledge will be improved by the end of the course.
- Decide on how much time students should be working on the course each week.
- Ask for feedback from learners continuously throughout the course – already early at the beginning of the course.
- Prepare course content and resources that are available in a digital form.
- Use a learner-centred approach and customise and personalise learning.
- Make sure that all participants are given enough opportunities for interaction during each online session.
- If possible, divide the class into smaller groups when teaching in a video-conferencing platform.
- Decide on how you are going to communicate with learners during the course.

4 A case study

The aim of the case study was to observe the characteristics of an individual unit – a group of teacher trainees during a bachelor’s level methodology course Drama Techniques in Teaching English as a Foreign Language I. (DRA1) in the winter term of the 2020/2021 academic year at the J. Selye University, Faculty of Education, Department of English Language and Literature, in Komárno, Slovakia.

The general method applied was unstructured participant observation to yield profiles of individual behaviour as well as group interaction. Correlation between course attendance (attendance of weekly course sessions) and the final results of students (successful course completion) was examined. The setting, at the beginning of the study, was in the natural environment of the university premises – classroom setting for three weeks. During the following ten weeks the course was shifted to an online environment due to the Covid-19 pandemic and general lockdown in Slovakia. 17 teacher trainees of English as a foreign language participated in the research. They were students in the third year of their studies at bachelor’s level, teacher training.

The case study presents the principles and goals of shifting DRA1 course to online space. The main aim when putting the previously exclusively offline DRA1 course online was to increase student-student and teacher-student interaction and student engagement in order to increase successful course completion and avoid student drop-out. Students’ involvement is checked not only by their active participation in online sessions on a video-conferencing platform, but also by their regular contributions (both oral and written) as well as their success in passing the course (pass the final test and hand in the final project).

4.1 Putting drama online

Traditional, classroom-based drama activities are hard to imagine in an online environment, since the essential parts of drama courses include plenty of movement, physical activities and tasks, non-verbal communication, using props, group work and intensive learner cooperation. The main objectives of the DRA1 course offered for EFL teacher trainees include the presentation and demonstration of the most frequently used drama techniques in teaching foreign languages. In the offline version of the course, the instructor presents concrete drama-based activities and lesson plans, the trainees participate actively so that they experience how drama is used in education through direct involvement, emotional engagement and active cooperation with other course participants. The most significant drama techniques presented during the course are the following: hot seating, mirroring, miming, teacher narrative, role-play, mingling, sculpting and improvisation.

The shift to online space was based on the constructivist approach to online teaching and focused on resource-based

learning, collaborative learning and problem-based learning. Tools and applications used during the online DRA1 course: e-mail, Zoom video-conferencing platform (interactive online lessons; one session every week), YouTube (for watching short videos), Moodle, online journals, blogs and the department website for publishing the syllabus.

E-mail

The online course was set off with an introductory e-mail sharing basic information about the course, time schedule and instructions regarding attendance of online lessons. E-mail is the most commonly used tool between an online teacher and the learners, it is the tool of one-to-one communication as well, since it offers the feeling of privacy and also immediate response, since e-mails are usually checked on a daily basis. In addition, e-mails offer a means of preserving written information, if the learners forget about something, they can search for it in previous e-mails. The learners need to feel that they can turn to the course instructor or teacher any time without agreeing on a consultation date or online meeting in advance. Being able to contact the instructor can improve the learner's sense of connectedness, and feeling of support from the side of the teacher, who is more accessible in this way.

Disadvantages of e-mails include the absence of non-verbal communication, lack of visual contact and the fact that it can be really time-consuming for the teacher if there is a high number of students or more online courses simultaneously. This requires high-level organization skills from the teacher and establishing boundaries at the beginning of the course, e.g. about how often and when, in which cases the teacher will respond to e-mails, could help avoid this problem. DRA1 students used e-mails for asking for clarifications regarding course requirements and asking for help from the teacher to clarify terminology.

Audio-video conferencing

Video conferencing platforms have gained wide popularity during the last few years and have received special and intensive attention during the COVID-19 pandemic. Audio-video conferencing is an interactive form of communication involving a camera, microphone, document sharing opportunities and chat. It provides space for more people taking part in verbal and visual communication simultaneously.

Video conferencing can be carried out with the help of various software and Internet-based tools, based on the type of the concrete tool, video conferencing can integrate other features such as a whiteboard area, application sharing, sharing the computer screen to another user, text messaging, polling, file sharing (Dawley 2007: 145). By using a video conferencing platform, both the teacher and the learners become more real, by seeing facial expressions, eye contact, and non-verbal communication. Interaction between both the teacher and the learner as well as interaction between learners becomes more intensive.

During the DRA1 course, the Zoom video conferencing platform was used. It is a platform for video, voice, content sharing, and chat runs across mobile devices, desktops, telephones, and room systems (www.zoom.us). The application allows whiteboard usage, both private and group text messaging, screen share and video communication with cameras and microphones. Power Point slide shows, videos were shared through this application during the DRA1 online sessions. The Zoom application provides opportunities for recording conversation and sessions, however, this function was never used during DRA1 lessons.

All participants of the course owned and were able to use a webcam and had a microphone and all course participants had previous experience with Zoom (during the spring term of the year 2020).

Online YouTube videos, websites and blogs

Students watched YouTube videos about recorded drama sessions, which helped to demonstrate drama techniques that could not be presented in front of the screen by the instructor and

could not be tried and tested by the students themselves. In addition, students received links to drama websites and articles on educational drama, which they had to use as the basis for completing three different tasks which they had to send back to the instructor. The three tasks, all of them based on a problem to solve, could be completed in pairs or groups.

Working in small groups

The 17 students were divided into two groups, group A consisted of 7 students, group B of 10 students (based on students' timetable preferences). Unlike during previous academic years, this term students worked in smaller size groups in order to increase opportunities for oral interaction during online sessions.

Moodle

Course assessment requirements included handing in a final project, a lesson plan based on drama techniques designed for EFL learners together with a self-reflective feedback on the lesson plan (reasoning the choice of drama techniques and feedback on the compilation of the lesson plan). For this task, students could collect 50 points. In addition, students had to take an online test in Moodle, the university learning management system, for further 50 points. The final test consisted of open ended test items.

5 Findings

Drama techniques based on physical movement such as mingling (moving around aimlessly in the room to fill in space) or sculpting (making a sculpture of a person, idea, notion or scene, trying to express it through the posture and the face of the sculpture) were impossible to present through the physical engagement of the students in online space, since there were no opportunities for physical interaction between group members. These techniques were presented to students via online videos showing learners using or trying these techniques. However, mirroring, miming, teacher narrative, role-play, hot-seating and improvisation worked well and could be presented, though instructions and task completion had to be adjusted to the online environment. For example, when doing a role-play, each student was given a role-card through private chat, in a text message on Zoom. After having read their role, they could start the activity and communicate with others.

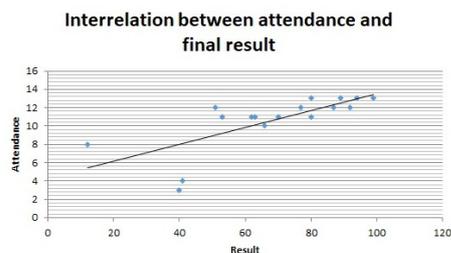
Attendance did not drop significantly after shifting the course online. During online sessions on Zoom (one session each week), student engagement could be observed based on the completion of tasks and participation in discussion. Each student completed at least one task connected to drama during the session and each student was involved in oral discussion, none of the students were silent or passive, though there were students who had to be encouraged to speak or challenged with a question.

When compared with the results of previous years, course drop-out rates, there is no significant change in the 2020/2021 online semester (see Table 1).

Year	Number of students enrolled in DRA1	Drop-out rate
2020/2021	17	17.65%
2019/2020	33	13%
2018/2019	16	18.18%

Table1: DRA1 course drop-out rates in three consequent academic years.

When examining the interrelation between attendance and final results (scores), strong correlation can be observed (see Graph 1).



Graph 1: Interrelation between students' class attendance and their final result

Students could attend the maximum of 13 sessions (3 face-to-face sessions and 10 online sessions). Arithmetic mean is 11.00, standard deviation is 2.87. The maximum of attended classes: 13, minimum: 3, sample range: 10, modus: 11, median: 11.

Students could collect the maximum of 100 points. Arithmetic mean is 69.69, standard deviation is 22.51. The maximum of obtained points: 99, minimum: 12, sample range: 87, modus: 80, median: 70.

There is directly proportional, linear, strong correlation between attendance and result (COR: 0.73), the more classes students participated in, the more likely they were to collect more points to pass the DRA1 course.

6 Discussion

Our findings support the research findings of Sedef Uzuner Smith and Ruchi Mehta, who examined a fully online course, master's level in the United States (Uzuner-Mehta 2013). The course being observed consisted of seven modules, each module lasted two weeks. The study of Smith and Mehta examined the role of dialogue, discussions and forms of interaction in the learning process and is a great example of investigating the social nature of learning. Though the course was not centred on drama techniques (it was about issues related to language, literacy and technology), the impact of interaction being examined the number of students (19 students in the US course) as well as course length (14 weeks) are very similar to our data. Contrary to Smith and Mehta, who examined students' attitudes on the quality of discussion and their perception of their learning, instead of learners' attitude, our study examined their learning outcomes in relation to their active participation, attendance and engagement in the course and their success in passing the course and fulfilling assessment requirements.

More and more research findings support the fact that the key to successful online learning is the formation of an effective learning community as the vehicle through which learning occurs online (Palloff-Pratt 2007). Although our findings are limited to one single case study and need to be repeated with different types of online courses, they underline the importance of interaction and student engagement in online courses in avoiding student drop-out and maintaining course attendance and draw a link between student engagement and interaction and successful course completion.

7 Conclusion

The transition to online teaching should go along with the development of teachers' skills and training. The transformation of existing practice, which was actually forced by external (pandemic) factors will definitely influence future approaches to the forms and platforms of teaching and learning. Sociocultural theories on learning and constructivist approaches to online learning will continue to be more and more dominant, since learner involvement and interaction are the key elements of effective learning.

Though the transformation of methodological drama courses in higher education into online space seem to be one of the greatest challenges an instructor can face, in the case of the DRA1 course

at J. Selye University in Komárno, a learner-centred approach, focusing on learner involvement, problem-based learning and the selection of the right online tools managed to keep students involved, could support successful learning and helped avoid an increase in student drop-out.

Literature:

1. Abrami, P. C., Chambers, B. – Poulsen, C. – De Simone, C. – d'Appolonia, S. – Howden, J. 1995. *Classroom Connections: Understanding Cooperative Learning*. Toronto: Harcourt Brace.
2. BACH, Shirley – HAYNES, Philip – SMITH, Jennifer Lewis: *Online Learning and Teaching in Higher Education*. Berkshire: Open University Press, 2007. 209 p. ISBN-10: 0-335-21829-6.
3. BERNÁTOVÁ, Renáta, Milan BERNÁT, Janka PORÁČOVÁ a Melinda NAGY. *Teaching of the thematic unit photosynthesis in the natural sciences with didactics for teacher training programmers in primary education with the support of the interactive whiteboard*. *Journal of Science Education = Revista de Educacion en Ciencias*. = Revista de Educacion en Ciencias Vol. 21, no. 2 (2020), pp. 1-10. ISSN 0124-5481.
4. BERNÁTOVÁ, Renáta – BERNÁT, Milan – PORÁČOVÁ, Janka – NAGY, Melinda – SEDLÁK, Vincent – SEPEŠIOVÁ, Michaela – VADAŠOVÁ, Bibiana: *Visualization of the logical structure of biologically and ecologically oriented curriculum and its application in teaching to increase the level of understanding of causality (Coherence of cause and effect) in the curriculum*. *Journal of Science Education = Revista de Educacion en Ciencias*. = Revista de Educacion en Ciencias Vol. 20, no. 2 (2019), pp. 54-75. ISSN 0124-5481.
5. BOETTCHER, V. Judith – CONRAD, Rita-Marie: *The Online Teaching Survival Guide: Simple and Practical Pedagogical Tips*. San Francisco: Jossey-Bass. 2010. 287 p. ISBN 978-0-470-42353-0.
6. CONRAD, Rita-Marie – DONALDSON, J. Ana: *Engaging the Online Learner: Activities and Resources for Creative Instruction*. San Francisco: Jossey-Bass. 129 p. ISBN 0-7879-6667-3.
7. DAWLEY, Lisa: *The Tools for Successful Online Teaching*. London and Hershey: Information Science Publishing, 2007. 260 p. ISBN 978-1-59140-956-4.
8. HAŠKOVÁ, Alena – ŠAFRANKO, Csilla – PAVLÍKOVÁ, Martina – PETRIKOVIČOVÁ, Lucia: *Application of Online Teaching Tools and Aids during Corona Pandemics*. AD ALTA: Journal of Interdisciplinary Research. Vol. 10, n. 2/2020, pp. 106-112. ISSN 1804-7890.
9. KO, Susan – ROSSEN, Steve: *Teaching Online: A Practical Guide*. Third edition. London and New York: Routledge. Taylor and Francis Group. 2010. 450 p. ISBN-10: 0-415-99726-7.
10. LAMY, Marie-Noëlle – HAMPPEL, Regine. *Online Communication in Language Learning and Teaching*. Hampshire and New York: Palgrave Macmillan, 2007. 260 p. ISBN-13: 978-0230-00127-5.
11. MAROSI, Renáta. *Buddhism in P.L. Travers's Mary Poppins Novels*. In: ANTAL, Éva – CZEGLÉDI, Csaba – KRAKKÓ, Eszter, eds. 2019. *Contemporary Perspectives on Language, Culture and Identity*. Cambridge Scholars Publishing. pp. 86-100.
12. McWHAW, Katherine – SCHNACKENBERG, Heidi – SCLATER, Jennifer – ABRAMI, Philip C.: *From co-operation to collaboration: helping students become collaborative learners*. In: GILLIES, Robyn M. – ASHMAN, Adrian F.: *Co-operative Learning: The social and intellectual outcomes of learning in groups*. London: RoutledgeFalmer, 2003. pp. 69-86.
13. MESKILL, Carla, ed.: *Online Teaching and Learning: Sociocultural Perspectives*. London and New York: Bloomsbury Academic, 2013. ISBN 978-1-4411-5945-8.
14. MURPHY, Linda: *Online Language Teaching: The Learner's Perspective*. In: HAMPPEL, Regine – STICKLER, Ursula, eds.: *Developing Online Language Teaching: Research-Based Pedagogies and Reflective Practices*. Hampshire and New York: Palgrave Macmillan, 2015. 206 p. ISBN 978-1-349-48951-0. pp. 45-62.
15. PALLOFF, Rena. M. – PRATT, Keith: *Lessons from the Cyberspace Classroom: The Realities of Online Teaching*. San Francisco: Jossey-Bass, 2001. 204 p. ISBN 0-7879-5519-1.

16. PALLOFF, Rena. M. – PRATT, Keith: *Building Online Learning Communities: Effective Strategies for the Virtual Classroom*. San Francisco: Jossey-Bass, 2007. 292 p. ISBN 978-0-7879-8825-8.
17. SHARMA, Pete – BARRETT, Barney: *Blended Learning: Using Technology in and beyond the Language Classroom*. London: Macmillan, 2007. 160 p. ISBN 978-0-230-02083-2.
18. SENKAR, Patrik: *Cultural and Literary Concretizations of Language Specifics from the National Minority Aspect*. AD ALTA: Journal of Interdisciplinary Research. Vol. 9, n. 1/2019, pp. 259-262. ISSN 1804-7890.
19. SENKAR, Patrik: *Lowland Slovak Youth Literature and its Interpretational and Educational Aspects (within and outside the School)*. Journal of Language and Cultural Education. Vol. 7, n. 3/2019, pp. 97-114. ISSN 1339-4584.
20. STALEY, David J.: *If the future is now, what is next?* In: HOFFMAN, Steven J., ed. 2011. *Teaching the Humanities Online: A Practical Guide to the Virtual Classroom*. London and New York: Routledge. Taylor and Francis Group. ISBN 978-0-7656-2082-8. pp. 157-170.
21. SMITH, Sedef Uzuner – MEHTA, Ruchi: *The Educational Value of Student Talk in Online Discussions*. In: MESKILL, Carla, ed.: *Online Teaching and Learning: Sociocultural Perspectives*. London and New York: Bloomsbury Academic, 2013. ISBN 978-1-4411-5945-8. pp. 119-135.
22. WATER, von de Manon – McAVOY, Mary – HUNT, Kristin: *Drama and Education. Performance Methodologies for Teaching and Learning*. London & New York: Routledge, 2015. ISBN 978-1-138-79951-6.
23. WELLER, Martin: *Delivering Learning on the Net: the why, what & how of online education*. London and New York: Routledge Falmer, 2005. ISBN 0-203-41696-1.
24. ZAHATŇANSKÁ, Mária – NAGY, Melinda: *An attempt to identify problems in the behaviour of teenagers and adolescents in Slovakia in relation to their creativity and success in the school*. AD ALTA: Journal of Interdisciplinary Research. Vol. 10, n. 1/2020, pp. 326-329. ISSN 1804-7890.

Primary Paper Section: A

Secondary Paper Section: AM

INFLUENCE OF THE SOCIAL COMPETENCE TRAINING ON PERSONALITY VARIABLES

^aLUCIA RAPSOVÁ

*Constantine the Philosopher University, Faculty of Education,
Department of Pedagogical and School Psychology, Dražovská
4, 949 74 Nitra, Slovakia
email: ^alrapsova @ukf.sk*

Abstract: The article presents the results of our research aimed to verify the influence of social competence training on participants' personalities. The object of our observation was the target group of lecturers. We focused on the development of their social competence and the cultivation of their personalities, which we consider to be one of the essential areas in adult education. For this reason, we wanted to achieve it with social competence training. We tried to find out whether and how the intentional stimulation of lecturers' social competence in the form of training will influence the level of observed personality variables. We measured these variables with a questionnaire NEO-FFI before and after the training finished. In the experimental group which participated in the training, we noticed a statistically significant increase in the values of personality factors E (extraversion) and K (kindness) at the level of significance 0,01; an increase in the values of the variables O (openness to experience) and C (conscientiousness) at the level of significance 0,05, and a decrease in the values of the variable N (neuroticism) at the level of significance 0,01.

Keywords: social competence, social competence training, lecturer, personality, personality variables, NEO-FFI

1 Introduction

The current period is characteristic not only with the scientific-technical development but also with different variables which have an impact on our society. These variables and ongoing progress require healthy, personally mature, educated and creative individuals. For this reason, in the current work employability, it is not enough to have only the institutionalised educational preparation for the work career in the lifelong cycle. The flexibility and the ability to complete and modify their abilities and skills have become crucial in achieving the required professional performance. Therefore, we can talk about continuously increasing requirements on the lifelong development and education of workers in various professions.

We focused on lecturers whose profession is lately in the centre of discussion because of work requirements placed on them. Lecturers work with people; they influence their personal growth; they form and cultivate other people. For this reason, it is crucial so that they possess the competence required for the performance of this profession. We suppose that the high-quality performance of this profession does not depend only on adequate education, but also on necessary personal qualities, social competence and other required skills. We think that social competence has become indispensable and inseparable part of their work.

We agree with opinions of several experts (Bramley, 1997, Hupková, 2011, Komárková, Slaměník, Výrost, 2001, Veteška, 2010) who say that the most intensive way to develop social competence is to provide high-quality professional, theoretical and practical preparation which includes training aimed at the development of the given competences.

The social competence training focuses on the use of active methods for the psychological work in groups, and it aims to develop participants' social competences and personalities (Silberman, Auerbach, 2006). It is possible to understand this training as a systematically planned approach carried out in an artificially created and controlled environment full of trust and confidence. In this way, we can influence the group processes and group behaviour. Based on their experience, participants can develop their social competence which enables them to cope with new social situations, to create positive social interactions and to use more efficient alternatives in their social behaviour (Bratská, 2000, Hermochová, Vaněková, 2001, Müller de Morias, Rapsová, 2017, Spence, 2003).

In the last decades, we noticed a significant boom in the training programmes. There also increased the number of research findings dealing with their effects.

We aimed to create a training programme for adult education lecturers focused on the development of their social competences. Subsequently, we experimentally verified its efficiency. Our basis was the verified statement of Lábath and Smik (1991). They expressed their assumption that training has an impact not only on the outer dimension of interpersonal processes and relationships, but it also influences intra-psychological processes.

Personality variables combine with social variables, and their compatibility offers a balanced relationship. They are attributes of social competence which represents the ability of individuals to react in various interpersonal situations successfully. For this reason, the lecturer profession highly requires this feature.

2 Research question and hypotheses

Our primary research task was to answer the question: „What influence does our proposed training programme aimed at the development of lecturers' social competence have on chosen personality variables?”

For the needs of our research, we formulated the following research hypotheses:

H₁: We suppose that the social competence training will statistically significantly decrease the level of the variable „neuroticism“ in the experimental group.

H₂: We suppose that the social competence training will statistically significantly increase the level of the variable „extraversion“ in the experimental group.

H₃: We suppose that the social competence training will statistically significantly increase the level of the variable „openness to experience“ in the experimental group.

H₄: We suppose that the social competence training will statistically significantly increase the level of the variable „kindness“ in the experimental group.

H₅: We suppose that the social competence training will statistically significantly increase the level of the variable „conscientiousness“ in the experimental group

3 Research sample

Our research sample consisted of lecturers working in various institutions and facilities in Nitra region (the Regional Library of Karol Kmeňko in Nitra, Regional Tutorial Centre in Nitra, Regional Tutorial Centre in Levice and others). Forty-two educators of adults participated in our research, and we divided them into two experimental groups and two control groups. The first experimental group and the first control group had the same number of participants (N=12). Both second experimental and control groups also had the same number of participants (N=9). We carried out our proposed training programme of 80 lessons aimed at the development of social competence for a half year period. Contrary, in the control groups, we did not intervene at all.

Regarding the number of participants in the training (experimental) groups, we followed the recommendations of various experts dealing with the issue of personal cultivation with training. They say that efficient training group should not consist of more than 15 members (Gillernová, Štětovská, 2009, Hupková, 2010, Popelková, Zafková, 2009).

4 Research methods

We designed our research in the form of an experiment with two experimental groups which participated in the social competence training, and two control groups which we did not stimulate intentionally.

We focused on the experimental verifying of the influence of the social competence training on chosen personality variables (N - neuroticism, E - extraversion, O - openness to experience, K -

kindness, C - conscientiousness). We measured these variables using a standardised multidimensional questionnaire NEO-FFI (NEO five - factor personality inventory) based on the five-factor personality model called „BigFive“. The questionnaire authors are Costa and McCrae. Ruisel and Halama (2007) created the Slovak version of the questionnaire. The five - factor personality model is a structural model of personality features describing the whole personality. BigFive represents a minimal number of dimensions indispensable for an adequate personality description. It is possible to apply this questionnaire to the age group of 14 - 81 years. The questionnaire does not have any time limit (it usually takes 10 - 15 minutes). The administrated material consists of 60 items, and the tested person evaluated these items with a 5-point scale (0 - this does not apply to me at all, 1 - this applies to me only very little, 2 - this does and does not apply to me, 3 - this predominantly applies to me, 4 - this applies to me completely). The questionnaire evaluates the set basic personality dimensions - neuroticism, extraversion, openness to experience, kindness and conscientiousness (Ruisel, Halama, 2007).

We administrated the NEO-FFI questionnaire before the beginning of the social competence training, and also after this training finished (Table 1).

Table 1 Experimental plan

Research sample	1st phase	2nd phase	3rd phase
	pre-test NEO-FFI	influence	post-test NEO-FFI
EG ₁	yes	yes	yes
EG ₂	yes	yes	yes
CG ₁	yes	no	yes
CG ₂	yes	no	yes

Legend: EG₁ - experimental group 1, EG₂ - experimental group 2, CG₁ - control group 1, CG₂ - control group 2, NEO-FFI - NEO five - factor personality inventory,

5 Research results and discussion

In Table 2, we mentioned the comparison of particular personality variables of the questionnaire NEO-FFI at the whole level of the experimental group. To achieve better statistical results and evaluation, we joined the experimental and control groups, and we analysed the results concerning one experimental group (EG-21) and one control group (CG-21). In experimental groups, which participated in the structured type of social competence training, we found out a statistically significant difference in all personality factors (N, E, O, K, C).

When comparing the measures before and after the social competence training, we noticed in all participants of the experimental group a statistically significant increase in values of the factors E (extraversion) and K (kindness) at the level of significance 0,01; as well as an increase in values of the variables O (openness to experience) and C (conscientiousness) at the level of significance 0,05. We also observed a decrease in values of the factor N (neuroticism) at the level of significance 0,01.

Table 2 Comparing of personality variables within the experimental group.

		Experimental group					
		N	M	SD	t	df	p
N	before	21	21,24	7,49	4,806	20	0,000
	after	21	17,95	5,04			
E	before	21	28,43	3,97	-7,120	20	0,000
	after	21	32,14	4,30			
O	before	21	27,14	6,87	-2,355	20	0,029
	after	21	28,48	6,10			
K	before	21	32,24	5,75	-3,408	20	0,003
	after	21	34,62	4,76			
C	before	21	36,95	7,28	-2,726	20	0,013
	after	21	39,14	4,69			

Legend: N - number, M - mean, SD - standard deviation, t - value of t-test, df - degrees of freedom, p - level of significance, N - neuroticism, E - extraversion, O - openness to experience, K - kindness, C - conscientiousness.

In the experimental group, the measure after finishing the training programme confirmed a statistically significant decrease in values of the personality dimension N (neuroticism) up to 3,29 points when compared to the initial measuring. Based on this finding, we can say that *hypothesis H1*, where we supposed a statistically significant decrease in the values of the variable „Neuroticism“ with the social competence training, was confirmed. Since in the first measuring the average levels were surprisingly higher in 2,34 points when compared to standard levels, we consider this significant decrease in values as a positive feature. The initial score in the dimension „Neuroticism“ is characteristic with a higher emotivity, uncertainty, moodiness and increased nervousness. Individuals with a higher score sometimes have problems to control and modify their impulses adequately. They also cope with stress situations worse. The decrease of average values in this dimension points to emotionally more stable, balanced and more satisfying behaviour. People with a lower score in neuroticism are more self-confident and satisfied with themselves, which also influences their work performance. They can control themselves better, and they overcome obstacles by generating more efficient coping strategies. Neuroticism is one of the negative factors influencing the efficiency of interpersonal relationships which are essential in lecturers' work. We think that emotional stability is an indispensable assumption for the performance of this profession because lecturers' work includes high psychological requirements. According to Kollárik (1992), emotional stability is close to emotional maturity. It is the emotional instability which often hinders success at work. Based on the significance of social competence, we can also mention a remarkable finding of Prospěchová, Blížkovská (2003). They observed a mutual relationship of personality characteristic features and social competence with a sample of 91 respondents, using the BigFive questionnaire. Their research results pointed to the correlation between personality features and social competence as meaning that the main predictors of social competence are extraversion and a low level of neuroticism.

The increase in values in the mentioned personality dimensions (E, O, K, C) indicates the shift of behaviour towards more adaptive forms.

We found out the most significant shift in values increased in 3,71 points in the personality variable E – extraversion when we compared the input and output measures in the experimental group. In this way, we could confirm the hypothesis H2 where we supposed that, with the social competence training, there would be a statistically significant increase in the level of the variable „extraversion“ in the experimental group. We can interpret a higher score as a shift towards more active, cooperative and social behaviour. Sociability is one component of extraversion, and it reflects in a positive relationship to other people and a strong preference of society. Extravert people show an increased interest in people in the outer world; they are satisfied, optimistic and communicative. For this reason, they are very popular in society. Higher extraversion often connects with the ability to lead other people. These individuals tend to have logical thinking; they are practical, objective and creative in looking for possible solutions and new approaches in task fulfilling. They are usually realistic, and they suppress intuition. At the same time, they act emotionally what often leads to interpersonal conflicts they try to solve assertively. Barrick, Mount (2005) found out that extraversion positively predicts performance and success in professions with a dominant interpersonal contact. The profession of a lecturer in adult education belongs to these professions as well. In their research, Mahony, Statson (2005) included 192 students, and they concluded that extraversion is a personality factor for expressing relationships. According to Judge et al. (1999), extraversion predicts, to the most considerable extent possible, leadership, management and organising what usually belongs to the job

description of lecturers. In the area of psychological health, people perceive extraversion positively; it predicts general life satisfaction and level of happiness (Hayes, Joseph, 2003). A lower score in neuroticism (emotional stability) and a higher score in extraversion are required to achieve work satisfaction at various work positions (Roberts, 2001). Satisfaction with work is a decisive factor for lecturers because there is a typical turnover of staff in this profession.

In the final measuring of the participants from the experimental group after finishing the training, we recorded a statistically significant increase (in 1,34 points) in the average levels in the personality scale O - openness to experience. From the facts mentioned above, it is evident that the *hypothesis H3, where we supposed that the social competence training would statistically significantly increase the level of the variable „openness to experience“, was confirmed*. For this reason, we can talk about more adaptive forms of behaviour such as unconventional and creative behaviour which is identified mainly with curiosity. Open individuals are more curious about the outer as well as the inner world, and they have more experience in their lives. They tend to look for and bring new ideas and unconventional values. They often fulfil their tasks originally and creatively. Openness is mainly related to divergent thinking which correlates with creativity. Open individuals creatively approach tasks what is another positive finding because the work of lecturers has high requirements on creativity. In his research, Schwarz (2012) found out that openness to experience plays a significant role in the development of competences, where people obtain new knowledge and experience, e.g. in differently focused types of training. These workers are willing to work on the development of their competences and personalities. 95% of agreeing answers confirmed this tendency in the question about the willingness of participants to strengthen their social competence. We think that this desire of participants to strengthen their abilities, skills and competences is highly beneficial for this profession because there increases the need for continuous education and self-development of these workers together with higher requirements on the performance of this profession.

In the second measuring of the personality variable K (kindness), we observed a statistically significant increase in average values in 2,38 points in comparison to the first measuring. This fact *confirmed the hypothesis H4 where we supposed that the social competence training would statistically significantly increase the level of the variable „Kindness“*. Kindness is a dimension with interpersonal tendencies. A higher score in this factor (K) indicates a shift towards tolerant, respectful and sensible behaviour. Ruisel, Halama (2007) say that the factor of kindness estimates the individual's interpersonal orientation. Kind individuals try to have positive and helpful relationships with other people at work. In general, people think that individuals with higher kindness are more credible, trustful, altruistic, socially desirable, as well as psychologically more healthy. They are indispensable mainly in the work environment, which requires continuous team cooperation. According to Barrick, Mount (2005), kindness also predicts higher performance in teamwork what is valid for lecturers' work as well. Weisová, Suss (2007) think that if we want to take social and personal characteristic features into account, we should focus on extraversion and kindness. These factors represent the crucial features enabling an individual to involve others. At the same time, they allow other people to involve this individual what is an assumption for the cooperation. Kind people can adapt to various personal and work conditions and activities more efficiently. This feature is very required because lecturer's work represents the whole spectre of various activities.

We noticed a significant difference in the final measuring of the personality variable C (conscientiousness) in the increased score in 2,19 points when we compared the obtained results with the values in the initial measuring. Based on this finding, we can *confirm the hypothesis H5 where we supposed that the social competence training would statistically significantly increase the level of the variable „conscientiousness“ in the experimental group*. We can interpret the increase of the given value in this

factor (C) as a behaviour with characteristic features such as ambition, responsibility and reliability. These individuals consider themselves as more intelligent. This attitude reflects in successful fulfilling of their tasks and duties. Barrick, Mount (2005) focused on finding the relationship between personality dimensions (N, E, O, K, C) and work performance in their research. They found out that higher values of conscientiousness are related to more consistent fulfilling of tasks, general work performance and efficiency at various work positions. Conscientious people are responsible for their tasks and, therefore, they are more successful at work (Kollárik, 1992). One feature of higher conscientiousness is also the ability to resist impulses and to regulate their desires. This self-control has an impact on more operational planning, organising and fulfilling of the set aims. Out of all factors, we can consider conscientiousness the most reliable criterium of work performance. Conscientiousness predicts longterm satisfaction in the career, and it is related to the general psychological well-being (Hayes, Joseph, 2003, Judge et al., 1999). Judge et al. (1999) found out that emotional stability and conscientiousness have a high correlation with performance motivation. We think that the assumption of every good performance is determined not only by competences and requirements but also by inner motivation.

In Table 3, we mention results of comparing particular personality variables from the NEO-FFI questionnaire at the whole level of the control group where we also carried out two measures with the absence of the training intervention.

When we compared the initial and final measuring by the participants of the control group, we surprisingly recorded a statistically significant decrease of the personality variable C (conscientiousness) at the level of significance 0,02. We did not notice any statistically significant difference in the rest observed dimensions when we compared both measures in the control group.

Despite our expectations, in the final measure of the personality variable C - conscientiousness, we recorded a statistically significant decrease in average values in 1,72 points in the control group. These unexpected results could be the effects of the influence of various factors which we cannot identify. A lower score in conscientiousness indicates a shift to careless, non-systematic and non-organised behaviour. However, in the initial measuring, the control group achieved 1,29 points more than it was the average score when we compared these results with the standardised values (34,57), what means a difference of only 0,43 points between the decrease of the final values and the set standard.

Table 3 Comparing of personality variables in the control group

		Control group			t	df	p
		N	M	SD			
N	before	21	22,24	8,54	-1,34	20	0,195
	after	21	23,05	7,16			
E	before	21	28,05	6,90	1,301	20	0,208
	after	21	27,10	6,74			
O	before	21	26,24	4,91	1,347	20	0,193
	after	21	25,14	4,43			
K	before	21	31,38	6,25	-0,087	20	0,932
	after	21	31,43	6,90			
C	before	21	35,86	7,09	2,166	20	0,043
	after	21	34,19	6,55			

Legend: N - number, M - mean, SD - standard deviation, t - value of t-test, df - degrees of freedom, p - level of significance, N - neuroticism, E - extraversion, O - openness to experience, K - kindness, C - conscientiousness.

We measured significant differences in particular personality variables in the experimental group. Despite the obtained results, we think it is crucial to draw attention to the fact that there is a controversy related to their stability versus instability in the approach to the personality and its features (Costa, McCrae,

1994). Stability of personality changes belongs to the problematic areas in personality psychology in theoretical and empirical observation. Results of several studies point to significant stability of personality features in time (Harris, Brett, Johnson, Deary, 2016). Based on our findings, as well as on the findings of Popelková, Solárová, Zaťková (2003) who carried out similar research, we concluded that it is possible to achieve personality changes with intentional and longterm stimulation. However, there remains questionable the stability of these changes in time. Therefore, in the future experiments of this type, we would recommend repeating these measures with at least a half-year period after the end of the training. Popelková, Zaťková (2009), within their research, carried out measures one year after the intervention programme finished. Out of all personality factors, they found out a statistically significant difference in the neuroticism at the level of significance 0,05 (a lower level of longterm effect). Regarding the stability of changes in time, Popelková, Zaťková (2009) once again confirmed the results about the high stability of personality variables. Similarly, Blatný, Urbánek (2004) confirmed the high stability of personality variables with their research. They explain this fact with high stability of biological bases for neuroticism and extraversion, which express the basal personality dispositions in the area of emotionality and general personality orientation.

6 Conclusion

Our article dealt with the interpretation of partial results of our research, where we experimentally verified the influence of our proposed training programme aimed at the development of lecturers' social competence. We dare to say that social competence is lecturers' primary competence. Thanks to this competence, lecturers can successfully and efficiently carry out their various work activities.

The results of our research confirmed our assumptions about the influence of the social competence training on personality variables which participate in successful and efficient acting of an individual in the incessantly changing social environment. It is possible to interpret these findings as a shift in the behaviour of participants to more adaptive forms which enable them to fulfil their social and work roles better.

Even though it is not possible to generalise our research results for the whole population nor the whole group of lecturers in adult education, we can talk about the efficiency of our training programme based on our findings.

It is possible to maintain achieved positive changes in intrapersonal variables with an intentional stimulation in the form of training, which is part of lifelong education. Social competence training has reasonably become a significant area of personality development in the system of lifelong education. This high-quality training can efficiently support acting of individuals in the society, achieving their personal and work objectives, as well as the quality of their lives (Müller de Morais, Rapsová, 2019). Training programmes offer many longterm advantages not only for the participants but also for their social environment. Training extends the possibilities of education, cooperation and help to other people. It also contributes to personality development, supporting self-education and self-improvement together with responsible planning of their lives. Similarly to Praško, Možný, Šlepecký (2007) and Segrin (2000), we think that training programmes of this type also fulfil a preventive role because prevention is not only about preventing mental health problems, but also about strengthening of competences.

Literature:

1. Barrick, M. R., Mount, M. K.: Yes, personality matters: Moving on to more important matters. In *Human Performance*, 2005. 18 (4). pp. 359-372. ISSN 1532-7043.
2. Blatný, M., Urbánek, T.: Personality stability and change in adolescence: Analysis on the level of personality types. In

- Československá psychologie*, 2004. 48 (4). pp. 289-297. ISSN 0009-062X.
3. Bramley, P.: Evaluating Effective Management Learning. In *Journal of European Training*, 1997. 23 (3). pp. 145-155. ISSN 8439-8030.
4. Bratská, M.: Skúsenosti s programom Konštruktívne riešenie a zvládanie záťažových situácií u vysokoškolákov. In *Preventívne programy pre III. tisícročie: Teoretické prístupy a praktické skúsenosti v prevencii sociálnej patológie*. Bratislava: NOC, 2000. pp. 22-33. ISBN 80-7121-203-2.
5. Costa, P. T. Jr., McCrae, R. R.: Set like plaster? Evidence for the stability of adult personality. In Heatherton, T.F., Weinberger, J.L. et al. *Can personality change?*, 1994. pp. 21-40. <https://doi.org/10.1037/10143-002>
6. Gillernová, I., Štětovská, I. 2001. Pravidla a podmínky sociálne psychologického výcviku. In Komárková, R., Slaměnik, I., Výrost, J. et al. *Aplikovaná sociální psychologie III – Sociálněpsychologický výcvik*. Praha: Portál, 2001. pp. 23-35. ISBN 80-247-0180-4.
7. Harris, M. A., Brett, C. E., Johnson, W., Deary, I. J.: Personality stability from age 14 to age 77 years. In *Psychology and Aging*, 2016. 31 (8), pp. 862-874. <http://dx.doi.org/10.1037/pag0000133>
8. Hayes, N., Joseph, S.: Big 5 Correlates of Three Measures of Subjective Well-Being. In *Personality and Individual Differences*, 2003. 34 (4), pp. 723-727. [https://doi.org/10.1016/S0191-8869\(02\)00057-0](https://doi.org/10.1016/S0191-8869(02)00057-0)
9. Hermochová, S., Vaněková, D.: Stručná história a súčasnosť. In Komárková, R., Slaměnik, I., Výrost, J. et al. *Aplikovaná sociální psychologie III. Sociálně-psychologický výcvik*. Praha: Grada Publishing, 2001. pp. 46-60. ISBN 80-247-0180-4.
10. Hupková, M.: *Rozvíjanie sociálnych spôsobilostí v pomáhajúcich profesiách*. Bratislava: IRIS, 2010. 336 p. ISBN 978-80-89256-61-7.
11. Hupková, M.: Sociálna kompetencia ako jedna z kľúčových kompetencií andragóga a vybrané nástroje jej rozvíjania. In Veteška, J. et al. *Teorie a praxe kompetenčního přístupu ve vzdělávání*. Praha: Educa Service, 2011. pp. 121-70. ISBN 978-80-87306-09-3.
12. Judge, T. A. et al.: The Big Five personality traits, general mental ability, and career success across the life span. In *Personnel Psychology*, 1999. 52. pp. 621-652. ISSN 1744-6570.
13. Kollárik, T. et al.: *Sociálna psychológia*. Bratislava: UK, 1992. 545 p. ISBN 80-08-01828-3.
14. Komárková, R., Slaměnik, I., Výrost, J. et al.: *Aplikovaná sociální psychologie III*. Praha: Grada, 2001. 224 p. ISBN 80-247-0180-4.
15. Labáth, V., Smik, J.: *Expoprogram. Intervenčný program pre skupinovú prácu s deťmi a mládežou*. Bratislava: Psychodiagnostika, 1991. 198 p. ISBN 80-967169-9-9.
16. Mahony, J. M., Stasson M. F.: Interpersonal and personality dimensions of behavior: FIRO-B and Big Five. In *North American Journal of Psychology*, 2005. 7 (2). pp. 205-216. ISSN 1527-7143.
17. Müller de Morias, M., Rapsová, L.: *Tréning sociálnej kompetencie dospelých a seniorov so zdravotným postihnutím*. Praha: Česká andragogická spoločnosť, 2017. 120 p. ISBN 978-80-905460-9-7.
18. Müller de Morias, M., Rapsová, L.: Psychological bases of developing social competences of seniors with disability, In *Australian Journal of Adult Learning*, 2019. 59 (2). pp. 269-292. ISSN 1443-1394.
19. Popelková, M., Solárová, E., Zaťková, M.: *Intervenčné programy v príprave pracovníkov v pomáhajúcich profesiách*. Nitra: UKF, 2003. 94 p. ISBN 80-8050-713-9.
20. Popelková, M., Zaťková, M.: *Podpora rozvoja osobnosti a intervenčné programy*. Nitra: UKF, 2009. 210 p. ISBN 978-80-8094-296-4.
21. Praško, J., Možný, P., Šlepecký, M.: Kognitívne behaviorální terapie psychických poruch. Praha: Grada, 2007. 1064 p. ISBN 978-80-7254-865-1.
22. Prospěchová, T., Blížkovská, J.: Vybrané komponenty sociální kompetence ve vztahu k ostatním osobnostním charakteristikám. In *Člověk a společnost*, 2003. 6 (4), pp. 18 - 29. ISSN 1335-3608.

-
23. Roberts, B. W. et al.: *Personality Psychology in the Workplace*. Washington, DC: American Psychological Association, 2001. 337 p. ISBN 978-1557987532.
24. Ruisell, I., Halama, P.: *NEO-FFI. NEO pětifaktorový osobnostní inventár*. Praha: Testcentrum – Hogrefe, 2007. 45 p.
25. Segrin, CH.: Social skills deficits associated with depression. In *Clinical Psychology Review*, 2000. 20 (3). pp. 379-403. ISSN 0272-7358.
26. Schwarz, M.: *Osobnostné charakteristiky manažéra v kontexte sociálnej kompetencie*. Trnava: FF Trnavskej univerzity, 2012. 180 p. ISBN 978-83-7490-513-8.
27. Silberman, M., Auerbach, C.: *Active Training A Handbook of Techniques, Designs, Case Examples, and Tip*. New York: John Wiley & Sons, 2006. 380 p. ISBN 978-0-7879-7623-1.
28. Spence, S. H.: Social skills training with children and young people : theory, evidence and practice. In *Child and Adolescent Mental Health*, 2003. 8 (2). pp. 84-96. ISSN 1475-3588.
29. Veteška, J.: *Kompetence ve vzdělávání dospělých. Pedagogické, andragogické a sociální aspekty*. Praha: Univerzita J. A. Komenského, 2010. 199 p. ISBN 978-80-86723-98-3.
30. Weisová, S., Suss, H. M.: Sociální inteligence: přehled a kritická diskuse konceptu měření. In Schultze, R., Roberts, R. D. et al. *Emoční inteligence*. Praha: Portál, 2007. pp. 219-249. ISBN 80-7367-229-4.

Primary Paper Section: A

Secondary Paper Section: AN, AM

INTENSITY OF INNOVATION ACTIVITY AND ITS PROGRESSIVITY IN ENTERPRISES IN SLOVAKIA IN THE ERA OF INDUSTRY 4.0

*PATRIK RICHNÁK

University of Economics in Bratislava, Faculty of Business Management, Department of Production Management and Logistics, Dolnozemská cesta 1, 852 35 Bratislava, Slovak Republic
email: *patrik.richnak@euba.sk*

The paper is a partial output of VEGA No. 1/0375/20 research project titled „New dimension in the development of production management and logistics under the influence of Industry 4.0 in enterprises in Slovakia“.

Abstract: At present, it is not easy to define and recognise the innovative potential of an enterprise in a market environment. It is about identifying the components, relationships and understanding the concepts, interconnections and achieving the expected economic, social, environmental consequences of introducing and managing innovation. Innovation is associated with increased performance, the creation of new markets and competitive advantage. Enterprises are innovating to defend their existing competitive positions as well as to seek a sustainable competitive advantage. The paper's main goal was to examine the degree of the introduction of innovations in enterprises in Slovakia in the era of Industry 4.0 on the basis of a knowledge base and a questionnaire survey. By applying theoretical knowledge and statistical methods of evaluating the questionnaire survey, we came to potential opportunities for the development of innovation activity in the ongoing fourth industrial revolution in the surveyed enterprises.

Keywords: innovation activity, innovation development, innovation potential, digitisation, Industry 4.0

1 Introduction

It is not easy to define and recognize the innovative potential of an enterprise in a market environment. It is about identifying the components, relationships and understanding the concepts, interconnections and achieving the expected economic, social, environmental consequences of introducing and managing innovation.

The development of countries and enterprises is responsible for many changes in the world economy, which determines their future influence and success on the market. For this reason, businesses must be able to respond promptly to these changes. For several years, researchers have been researching what type of business is most likely to succeed in the innovation market and progress in their research activities. It is also essential to define what primary attributes must be met, the subject of the business, how long it has been operating in the market, etc.

Innovation can be seen as a renewal or improvement of existing, well-established things and phenomena with reintroduction into practice. Although, as an abstract concept, innovation is generally very important because it moves businesses and their activities forward, it should be mentioned that innovation can also have no benefit for the enterprise. We also meet with the opinions that bad innovation also contributes to the improvement of processes in the future, as long as the enterprise can identify it and convert it to its advantage only in case it is not liquidating for the enterprise at the outset.

2 Theoretical overviews

Innovation consists of creating a new idea and then implementing it in a new product, process or service. This leads to dynamic growth in the national economy and increased employment, as well as generating a net profit for the innovative enterprise (Kogabayev and Maziliauskas, 2017). According to Blindenbach-Driessen and van den Ende (2014), innovation is associated with increased performance, the creation of new markets and competitive advantage. Businesses are innovating to defend their existing competitive positions as well as to seek a sustainable competitive advantage. The term innovation includes new technological, economic, social and organizational solutions that are not necessarily marketable, in the economic sense and direct monetary impact, but are applicable and are being used within organizations (Silva et al., 2016). Innovations are a

proportionately significant factor in enterprises in various fields. The OECD defines an innovation as a new or improved product or process (or their combination) that differs significantly from the units of previous products or processes and has been made available to potential users (product) or has been put into use by the unit (process) (OECD/Eurostat, 2018).

Innovation can come from two sources: marketing and technology. Some products may require a coinciding of the two sources (Garcia, 2002). In addition, different types of innovation require different competencies, resources, knowledge and investments, leading to different potential risks (Smith and Tushman, 2005).

It is possible to classify and differentiate innovation using various metrics such as the object of innovation and the rate of innovation. Innovation in a firm may be non-technological, such as organizational and marketing innovation, and technological, such as product and process innovation (Geldes et al., 2017). We can classify innovations as product innovations, process innovations, marketing innovations and organisational innovations (European Commission/Eurostat, 1997). Piao and Zajac (2015) identified two types of use of innovations: reproduced use (repetition of existing designs for existing products) and incremental exploitation (creation of new designs for existing products). The authors concluded that these two uses have different effects during the survey. Utilisation can be defined as the gradual improvement of an existing product business aimed to improve the current domain product market, and the survey can be seen as the development of new products aimed at new areas of the product market. Szopik-Depezyńska (2015) distinguishes between different types of innovations that have different spheres of influence. In particular, product innovations relate to the impact of competition, demand and the market and are intended to replace products withdrawn from the market; expand the firm's offer in terms of products and services; create products that are environmentally friendly; increase or maintain market share; and enable the firm to enter new markets. Gubová (2020a) combines innovation with technology. The author says that innovations, especially in logistics activities, are in the midst of dynamic changes and enterprises must continuously manage and monitor them during everyday business activities, which affects the efficiency and effectiveness of production.

Enterprises can differentiate their innovation strategy between their exploitative strategy, which refers to presently employed technologies and tasks, and their exploratory strategy, which consists of technologies and tasks that are novel or radical (Jansen et al., 2006). Prange and Schlegelmilch (2016) have developed proposals to explain the interaction between different types of innovative paradigms of use and present the results of a survey that reflects the belief that enterprises are simultaneously or sequentially able to embrace several types of innovation. The survey leads to entirely new innovations and the use and maintenance of existing innovations. Businesses prefer innovations with long life cycles; however, mixing and overlapping them can lead to reduced performance.

The process of innovation development may vary from company to company, influenced, among other things, by the sector of activity or the size of the enterprise (Conde and Araújo-Jorge, 2003). Many foreign empirical studies have not established a clear relationship between enterprise size, market power and innovative activity. Baruk (2015) defines innovation activity as an ordered set of scientific, technical, organizational, financial, managerial and business activities carried out to develop and implement innovations. We consider business innovation a new or improved product or business process that differs significantly from business predecessors or business processes. A new or improved product has been introduced to the market or put into

use by enterprises. Some studies define business innovation as the result of competition in the market.

If the innovation leads to better products, lower costs, better or new features, it can also be classified in terms of the scope of function, i.e. to what extent the old product becomes a product with improved capability. This is the so-called economic (competitive) view. In this case, innovation is said to be radical if it results in a better product (lower costs, better attributes or new attributes), and existing products become functionally incapable of covering the new functions of the innovated product and are unable to compete in the market environment (Scuotto, and Shukla, 2015).

Digital technologies have nowadays a significant impact on how new business ventures are imagined and created. The arising technology paradigm is leveraging the potential of collaboration and collective intelligence to design and launch more robust and sustainable entrepreneurial initiatives (Elia et al., 2020). Some studies, such as Bouncken et al. (2019), examine the integration of digital technologies and their use in new business models. The challenge for businesses is the degree to which businesses are involved in digital transformation and digitisation. Businesses can apply digital technologies to improved or new internal and external processes and integrate them into new business models. The digital transformation itself in the enterprise requires extensive knowledge from different backgrounds. Vial (2019) defines digital transformation as a process that aims to improve an entity by inducing significant changes in its characteristics through a combination of information, computing, communication and connectivity technologies. Ongoing advances in artificial intelligence, digitisation, connectivity, smart machines and the Internet of Things (IoT) have brought about a digital transformation that ushers in a new era of technological development in the form of the 4th Industrial Revolution, also known as Industry 4.0 (Behrens and Trunschke, 2020). The fourth industrial revolution (Industry 4.0) is related to digitisation, augmented reality, automation, and intelligent technologies (Gubová, 2020b). The fourth industrial revolution represents a fundamental digital transformation. This revolution is known around the world as Industry 4.0, and it is advancing exponentially (Ghobakhloo, 2020). Industry 4.0 is associated with terms such as Cyber-Physical Systems (CPS), Internet of Things (IoT), Internet of Services (IoS), Robotics, Big Data, Cloud Manufacturing and Augmented Reality and will narrow the gap between the physical and the digital world (King and Grobbelaar, 2020).

An enterprise with a high market orientation will have more knowledge about the market in terms of customers and competitors; in this case, the knowledge of the external market acquired by the enterprise will vary in the amount of information, information channels and degree of difficulty, making it easier for enterprises and enterprise members to obtain more external relevant information (Martín-de Castro, 2015).

The combination of solid market interconnection and dynamic market turbulence can increase new product development performance. Conversely, customer preferences often do not change with low market turbulence, even with high market orientation. Team members will think that customer demand is the same or similar and will reduce members' motivation to absorb information (Chen et al., 2016). When we talk about developing change and making some progress, we are thinking about transferring ideas, technologies, and so forth. Horizontal progress means copying things that already work - from 1 to n. Horizontal progress (globalisation) is easy to imagine because we already know what it looks like. Vertical (technology) or intense progress means doing new things from 0 to 1. Vertical progress is harder to imagine because it requires something that no one else has ever done (Thiel and Masters, 2015).

Emerging businesses are very active in gaining knowledge from different sources and geographical areas, but these activities may reduce growth for top enterprises in the future (Huggins et al., 2015).

The last decade has been very progressive in terms of the promising technological advancements and transformations. New technologies are converging and making our life easier and more efficient and yet we are likely to see disruptive innovations that have never been considered before (Khan, 2019). Technological developments suggest that the importance of user innovation is likely to increase due to the growing importance of the internet, which connects communities, facilitates the exchange of ideas, access to complementary skills. According to Rayna et al. (2015), a shift in technological development can also be seen in process innovation such as 3D printing and other flexible processing technologies that allow users to produce individual products from digital models at relatively low cost. Economic implications of 3D printing and significance analysis of "Big Data" examined and in their study Kaulartz and von Hippel (2018). The main competence of 3D printing is to fabricate the products closer to the expectations of customers around the world and to customise those products in real time (Varsha Shree et al., 2020).

3 Research methodology and description of statistical data

The main goal of this research paper was to examine the degree of the introduction of innovations in enterprises in Slovakia in the era of Industry 4.0 on the basis of a knowledge base and a questionnaire survey. By applying theoretical knowledge and statistical methods of evaluating the questionnaire, we came to potential opportunities for the development of innovation activity in the ongoing fourth industrial revolution in the surveyed enterprises.

One hundred thirty-five enterprises operating in Slovakia took part in the questionnaire survey. Table 1 displays the share of respondents by the size of the enterprise. Small and medium-sized enterprises accounted for 63% of the total number of respondents involved. The second-largest share of respondents was represented by micro-enterprises with a share of 20.7%, and large enterprises formed the share of 16.3%. Based on quantifying the number of enterprises according to the Statistical Office of the Slovak Republic, the most numerous micro-enterprises are in Slovakia. In the survey, the largest group consisted of small businesses with a share of 37.8%. The research results showed that small and medium-sized enterprises are in the early stages of implementing Industry 4.0 elements. The mentioned structure of enterprises by size should be a model structure of the real state of enterprises performed by the Statistical Office of the Slovak Republic, as the fact that micro-enterprises are the most numerous in Slovakia does not create optimistic forecasts in the field of innovation development. Medium and large enterprises have an ideal business and market environment for developing innovation and strengthening the country's innovation potential. The intention should be state support for small and medium-sized enterprises, as they are currently inactive in the field of innovation. It is perhaps through the support of the levy and social area that this structure would change.

Table 1: Structure of the surveyed enterprises by enterprise size

Enterprise size	Percentage
Micro enterprises	20.7%
Small enterprises	37.8%
Medium-sized enterprises	25.2%
Large enterprises	16.3%

Source: author's processing

Based on the primary goal of the submitted paper, the following hypothesis was determined and tested:

H_0 : We assume no significant positive relationship between the size of the enterprise and the level of innovation implementation rate.

H_1 : We assume a significant positive relationship between the size of the enterprise and the level of innovation implementation rate.

In the framework of implemented research, there were several quantitative and expert research methods used. Methods of analysis and synthesis, induction and deduction, comparison and scientific abstraction were used to process the knowledge base. Pearson's χ^2 -independence test was used to verify the association to evaluate the data from the questionnaire survey. This test is also called the Chi-square homogeneity test. The basis of the test is to compare the agreement of theoretical frequencies with the found frequencies and to assess the significance of the differences between them. The condition to use the test is that the sample size is greater than 20 ($n > 20$) and that all theoretical frequencies are at least 5 ($E_{ij} \geq 5$). Fisher's exact test is another method of measuring the association between variables. It does not depend on the fulfilled conditions for a distribution with a sufficiently large sample, and therefore it is suitable to be used on small samples or weaker data, or unfulfilled conditions for the use of Pearson's Chi-square test ($n > 20$; $E_{ij} \geq 5$). Another statistical method for the data evaluation from the questionnaire survey was correlation analysis (Pearson's correlation coefficient), which examines the tightness of statistical dependence between quantitative variables. Pearson Correlation and Spearman Correlation were applied for statistical verification. The results of the statistical tests are evaluated in Table 2.

Table 2: Results of the calculation of statistical data

Fisher's Exact Test		
Table Probability (P)	<.0001	
Pr <= P	0.0002	
Statistic	Value	ASE
Pearson Correlation	0.5112	0.0686
Spearman Correlation	0.5486	0.0726

Source: author's processing

Critical area $\chi^2_P > \chi^2_{1-\alpha} [(r-1) * (s-1)]$ where α is the selected level of significance, respectively $(1-\alpha)$ is reliability. $\chi^2_{1-\alpha} [(r-1) * (s-1)]$ represents the value that can be found using statistical software. Based on the calculation, we can conclude that if the inequality applies, we accept hypothesis H_1 and confirm the dependence. If the inequality does not apply, we do not have enough evidence to reject hypothesis H_0 and thus cannot confirm the dependence between the characters A and B.

Based on the results in Table 2 (testing the established hypothesis), we concluded that there is a significant positive relationship between the size of the enterprise and the level of innovation implementation, which accepts hypothesis H_1 and hypothesis H_0 is rejected.

4 Research results and discussion

At present, the innovation of undertakings also depends on the level of use of high-tech technology, resulting in the satisfaction of growing customer demands for quality, cost reduction, and rapid implementation of products. It is one of the solutions to the dynamic development of the industry at home and abroad. High-tech is closely linked to intelligent technologies, the Internet of Things (IoT), digitisation from primary production - raw material processing to product recycling. The effectiveness of enterprises' investment in innovation currently depends, in addition to finances, also on the size of the enterprise, the set strategic goals and the subject of the enterprise's activity.

Table 3 presents the share of innovations introduced in enterprises by enterprise size. A high share of implemented innovations was formed by non-technological innovations, marketing and organisational innovations with a share of 48.40%. With this percentage, these innovations are being introduced by large enterprises. The high share of this type of innovation is based on the connection between the organisation of processes, delegation and planning of new activities related to innovation changes in the enterprise. Furthermore, they are the activities of the organisation of production strategy, organisation of innovation forecasting, organisation of development

processes, production preparation, production logistics, essential production and post-production activities. The need for organisational innovation is caused by constant changes in products in technologies that need to be harmonised and organised. Based on table 3, we can see that medium-sized enterprises implement technological innovations the most. The percentage was 45%. We attribute this to the progressive growth of the use of technology, automation and the introduction of digitisation in enterprises. Micro-enterprises implement the most minor technological innovations with a share of 9%. Process innovations are implemented by large enterprises with a share of 33.3%. Medium-sized enterprises also had almost the same percentage when implementing process innovations. The percentage of the introduction of process innovations in these enterprises was 30.1%. The most minor process innovations are implemented by micro-enterprises, where the share was 12.4%.

Table 3: Proportion of innovation introduced in enterprises, expressed as a percentage by enterprise size

	Technological innovations	Process innovations	Non-technological innovations
Micro enterprises	9%	12.4%	2.1%
Small enterprises	18%	24.2%	25.8%
Medium-sized enterprises	45%	30.1%	23.7%
Large enterprises	28%	33.3%	48.4%
Total	100%	100%	100%

Source: author's processing

In connection with this question, we asked respondents about the intensity of how enterprises implement individual types of innovation. Technological innovations are implemented by 42% of enterprises, and process innovations are applied by 33% of enterprises in the range of 21% - 40%. Non-technological innovations are implemented by 47.4% of enterprises in the range of 1% - 20%.

At present, great attention is paid to introducing individual principles, elements, technologies of Industry 4.0. Based on this fact, in the questionnaire survey, we dealt with the level of implementation of innovations in the conditions of Industry 4.0, in order to achieve competitiveness and sustainability of the enterprise in the market. The results are shown in Table 4. The increase in labour productivity with a share of 51.1% is one of the most critical areas for the introduction of innovations in the conditions of Industry 4.0 in enterprises in Slovakia. For 48.9% of enterprises, the introduction of innovations in the conditions of Industry 4.0 means saving time. For 44.4% of respondents, the implementation of innovations represents a financial saving. Enterprises with a share of 40% consider the importance of innovation in the form of streamlining enterprise processes.

Table 4: Significance of the introduction of innovations in the conditions of Industry 4.0 in enterprises in percentages according to the scale (1-most significant and 5-least significant)

	1	2	3	4	5
Time savings	48.9%	30.4%	13.3%	4.4%	3%
Money savings	44.4%	25.9%	18.5%	8.2%	3%
Streamlining enterprise processes	40%	29.6%	20.7%	5.9%	3.7%
Increasing labour productivity	51.1%	25.9%	14.1%	5.9%	3%

Source: author's processing

If an enterprise introduces innovations in the field of saving materials and streamlining enterprise processes, it succeeds in reducing maintenance costs. Quality as the main effect brings

streamlining of enterprise processes and increasing labour productivity. Innovations introduced in Industry 4.0 conditions to reduce maintenance costs and increase productivity will reduce overall machine downtime. Increasing productivity in technical professions through automation leads to reduced overall machine downtime and an increase in overall productivity. By increasing productivity in technical professions through the automation of work, there is a decrease in stocks due to increased forecasting reliability. The shortening of the time of entry into the market with innovation is caused by the accuracy of the forecast, the reduction of stocks and the increase of quality and productivity in the enterprise. The time factor is essential in the implementation of innovations and the mutual influences of the introduced innovations on the savings of materials and energy, resulting in savings of time and finances, which in turn leads to streamlining processes in the enterprise. Saving time is equal to saving money. This confirms the business rule that time is money. Innovations in the field of saving materials and energy lead to saving time, money, streamlining enterprise processes and increasing labour productivity.

5 Conclusion

The survey aimed to examine the degree of the introduction of innovations in enterprises in Slovakia in the era of Industry 4.0. Based on the evaluation of data and processing of results, we concluded that the largest group in the survey consisted of small enterprises in Slovakia. These enterprises were represented in the survey with a share of 37.8%. We discovered that a high proportion of implemented innovations were non-technological innovations, marketing and organisational innovations from the evaluated data. These innovations accounted for 48.4% and are being introduced by large enterprises in Slovakia. From the processed data from the questionnaire, we also found out the level of introduction of innovations in the conditions of Industry 4.0. The increase in labour productivity with a share of 51.1% was one of the most critical areas for the introduction of innovations in enterprises in Slovakia. A significant positive relationship between the size of the enterprise and the level of innovation implementation was also confirmed.

The studies' results help enterprises obtain market and technological information more accurately, to transform available knowledge into their absorption capacity, to improve the performance of new product innovations and achieve a competitive advantage of absorption capacity.

New competitors in the market increase competitive strength, thereby reducing profit margins. The availability of close substitutes makes it difficult for the manufacturer to increase prices, with customers expecting products imitating competitors with lower prices. Suppliers can increase manufacturers' costs, while customers can benefit from margins in the form of lower customer prices and increased selling costs. In attractive industries, not all enterprises achieve sales. In fact, in an unattractive industry, there may still be some enterprises that generate revenue. In other words, within each industry, some enterprises will have a competitive advantage. They will, on average, be more profitable than their competitors and will also have innovation potential. An enterprise can offer cheaper or more differentiated products than its competitors if it has capabilities that cannot be easily imitated or traded. The basis of the enterprise is the ability to develop and use technology and knowledge of the market. The ability of enterprises to take advantage of innovation is a function of the extent to which they own or can build rare, complex imitation capabilities that are key to its value configuration (value chain, value network, value trade). We consider imitations to be an incentive in the development of new products and services. An imitator can motivate competing enterprises in a given market segment and can undertake new activities and generate new ideas. Imitations within the strategic position of enterprises create new forces and pressures within the market and force enterprises to constantly bring new ideas and fill market gaps. If managers underestimate the importance of user innovation, they are unlikely to realise the full potential of this key innovation.

Industry 4.0 will change enterprises' nature and increase the demands and requirements for skilled workers. The demand for labour will continue to grow as new professions emerge in enterprises to reflect on the digitisation of production and logistics.

In conclusion, given the changing consumer demand and cyclical technological improvements, it is necessary to manage innovation planning and build coherence between changing strategic plans and innovation initiatives. In order to increase efficiency, plan and manage the innovation process to suit the optimal time and product implementation process. Due to the shorter product life cycle, to produce practical improved new products to remain competitive, while emphasising the prolongation of the product life cycle on the market to reduce the environmental burden. Also, emphasise the precise planning, monitoring, control of spent and planned investment costs for research and development, as it is a way to be successful in the domestic and foreign markets.

Literature:

1. Baruk, J. (2015). Innovation activity management in scientific and research and development organizations. *Marketing of Scientific and Research Organisations*. 17(3). 121-145. doi: 10.14611/minib.17.03.2015.12.
2. Behrens, V., Trunschke, M. (2020). Industry 4.0 Related Innovation and Firm Growth. *SSRN Electronic Journal*. doi:10.2139/ssrn.3739871
3. Blindenbach-Driessen, F., van den Ende, J. (2014). The Locus of Innovation: The Effect of a Separate Innovation Unit on Exploration, Exploitation, and Ambidexterity in Manufacturing and Service Firms. *Journal of Product Innovation Management*, 31(5), 1089–1105. doi:10.1111/jpim.12146
4. Bouncken, R. B., Kraus, S., Roig-Tierno, N. (2019). Knowledge- and innovation-based business models for future growth: digitalized business models and portfolio considerations. *Review of Managerial Science*, 15(1), 1–14. doi:10.1007/s11846-019-00366-z
5. Conde, M. V. F., Araújo-Jorge, T. C. de. (2003). Modelos e concepções de inovação: a transição de paradigmas, a reforma da C&T brasileira e as concepções de gestores de uma instituição pública de pesquisa em saúde. *Ciência & Saúde Coletiva*, 8(3), 727–741. doi:10.1590/s1413-81232003000300007
6. Elia, G., Margherita, A., Passiante, G. (2020). Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process. *Technological Forecasting and Social Change*, 150, 119791. doi:10.1016/j.techfore.2019.119791
7. European Commission/Eurostat (1997). Proposed Guidelines for Collecting and Interpreting Technological Innovation Data. *The Measurement of Scientific and Technological Activities*. [viewed 2021-05-25]. Available from: <https://www.oecd.org/science/inno/2367614.pdf>
8. Garcia, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management*, 19(2), 110–132. doi:10.1016/s0737-6782(01)00132-1
9. Geldes, C., Felzensztein, C., Palacios-Fenech, J. (2017). Technological and non-technological innovations, performance and propensity to innovate across industries: The case of an emerging economy. *Industrial Marketing Management*, 61, 55–66. doi:10.1016/j.indmarman.2016.10.010
10. Ghobakhloo, M. (2020). Industry 4.0, digitization, and opportunities for sustainability. *Journal of Cleaner Production*, 252, 119869. doi:10.1016/j.jclepro.2019.119869
11. Gubová, K. (2020a). Utilisation of Technologies and Innovations in Logistics of Automotive Enterprises. *AD ALTA: Journal of Interdisciplinary Research*, 10(2), 91-95. doi:10.33543/1002
12. Gubová, K. (2020b). Changes in Corporate Logistics in the Slovak Wood Processing Industry. *Sustainability of Forest-Based Industries in the Global Economy: Proceedings of Scientific Papers*, 239-243.

13. Huggins, R., Izushi, H., Prokop, D., Thompson, P. (2015). Network evolution and the spatiotemporal dynamics of knowledge sourcing. *Entrepreneurship & Regional Development*, 27(7-8), 474–499. doi:10.1080/08985626.2015.1070538
14. Chen, K.-H., Wang, C.-H., Huang, S.-Z., Shen, G. C. (2016). Service innovation and new product performance: The influence of market-linking capabilities and market turbulence. *International Journal of Production Economics*, 172, 54–64. doi:10.1016/j.ijpe.2015.11.004
15. Jansen, J. J. P., Van Den Bosch, F. A. J., Volberda, H. W. (2006). Exploratory Innovation, Exploitative Innovation, and Performance: Effects of Organizational Antecedents and Environmental Moderators. *Management Science*, 52(11), 1661–1674. doi:10.1287/mnsc.1060.0576
16. Kaulartz, S., von Hippel, E. (2018). Lead User Innovation Identification: Rapid Semantic Analyses of Digital Conversations. *SSRN Electronic Journal*. doi:10.2139/ssrn.3249162
17. Khan, M. K. (2019). Technological advancements and 2020. *Telecommunication Systems*, 73(1), 1–2. doi:10.1007/s11235-019-00647-8
18. King, S., Grobbelaar, S. S. (2020). Industry 4.0 and Business Model Innovation: A Scoping Review. *2020 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)*. doi:10.1109/ice/itmc49519.2020.9198424
19. Kogabayev, T., Maziliauskas, A. (2017). The definition and classification of innovation. *HOLISTICA – Journal of Business and Public Administration*, 8(1), 59–72. doi:10.1515/hjbp-2017-0005
20. Martín-de Castro, G. (2015). Knowledge management and innovation in knowledge-based and high-tech industrial markets: The role of openness and absorptive capacity. *Industrial Marketing Management*, 47, 143–146. doi:10.1016/j.indmarm.2015.02.032
21. OECD/Eurostat (2018). Methods for collecting, analysing and reporting statistics on business innovation. *The Measurement of Scientific, Technological and Innovation Activities*. doi:10.1787/g280bac11e-en
22. Piao, M., Zajac, E. J. (2015). How exploitation impedes and impels exploration: Theory and evidence. *Strategic Management Journal*, 37(7), 1431–1447. doi:10.1002/smj.2402
23. Prange, C., Schlegelmilch, B. B. (2016). Towards a balanced view of innovations. *Management Decision*, 54(2), 441–454. doi:10.1108/md-05-2015-0198
24. Rayna, T., Striukova, L., Darlington, J. (2015). Co-creation and user innovation: The role of online 3D printing platforms. *Journal of Engineering and Technology Management*, 37, 90–102. doi:10.1016/j.jengtecman.2015.07.002
25. Scuotto, V., Shukla, S. (2015). Being Innovator or “Imovator”: Current Dilemma? *Journal of the Knowledge Economy*, 9(1), 212–227. doi:10.1007/s13132-015-0336-6
26. Silva, F. M. da, Oliveira, E. A. de A. Q., Moraes, M. B. de. (2016). Innovation development process in small and medium technology-based companies. *RAI Revista de Administração e Inovação*, 13(3), 176–189. doi:10.1016/j.rai.2016.04.005
27. Smith, W. K., Tushman, M. L. (2005). Managing Strategic Contradictions: A Top Management Model for Managing Innovation Streams. *Organization Science*, 16(5), 522–536. doi:10.1287/orsc.1050.0134
28. Szopik-Depczyńska, K. (2015). Effects of innovation activity in industrial enterprises in Eastern Poland. *Oeconomia Copernicana*, 6(2), 53. doi:10.12775/oec.2015.012
29. Thiel, P., Masters, B. (2015). *Zero to One : Notes on Startups, or How to Build the Future*. London, Virgin Books, Cop, 2015.
30. Varsha Shree, M., Dhinakaran, V., Rajkumar, V., Bupathi Ram, P. M., Vijayakumar, M. D., Sathish, T. (2020). Effect of 3D printing on supply chain management. *Materials Today: Proceedings*, 21, 958–963. doi:10.1016/j.matpr.2019.09.060
31. Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. doi:10.1016/j.jsis.2019.01.003

Primary Paper Section: A

Secondary Paper Section: AE

STUDENTS PERSONALITY DEVELOPMENT THROUGH INDIVIDUAL ACTION RESEARCH

^aBOHDANA RICHTEROVÁ, ^bBARBARA NEDVÍDKOVÁ

*University of Ostrava, Faculty of Education, Fráni Šrámka 3,
Ostrava, Czech republic
email: ^abohdana.richterova@osu.cz, ^bd19404@student.osu.cz*

The article was supported by a Grant Agency SGS 6114 Using the Personal Action Research Journal (PARJ) as a Tool of Professional Development of Social Education Students

Abstract: The paper presents a student project. Ten students of the Pedagogy Faculty carried out individual action research in different areas of social and personality development in the years 2019-2020. The aim of the paper is to present the project, its methodology, and the research problems that the students worked with. Four-phase model of action research by Kemmis, McTaggart (1988) was chosen. Six key topics were identified, all focused on development: communication skills improvement, self-value and self-trust improvement, facing demanding situations and work with escape strategies, skills of appropriate response in conflict situations, diminishing fear of entering new situations and work with negative evaluation of other people. An example of a chosen research presents the work of a student in action research phases focusing on work with stress.

Keywords: individual action research, four-phase model of action research, pedagogy faculty student, personality and social development.

1 Introduction

Papers focusing on methodology and conducting action research in the field of education come across the information that even though action research can be primarily focused on other areas than social personality development, it enables and encourages this very area of educators' development (eg. Mertler, 2006; Willis and Edwards, 2014). The paper introduces a student project of a particular university research aimed at conducting students' individual action research. Ten students of the follow-up masters programme at Pedagogy Faculty carried out individual action research in the years 2019-2020, the research tackled key issues needed for personality and social competence development. Two academic workers participated in the project apart from the students. One of the workers specialized in research methodology and organization, the other was an expert in psychological consultation with students in individual research phases, and he also worked with psychological pretests and posttests.

Selective courses with emphasis on theoretical subjects are the basis of teachers' preparation during university studies in the Czech Republic (National Accreditation Bureau, 2017). Personality and social development courses are the key for gaining the necessary personal and social competencies. Individual action research that students carried out in the project included both theoretical elements (eg. in the Plan phase – the analysis of literature regarding the research problem) as well as practical – self-experience (eg. in the Action phase students tested new procedures in problematic areas in their personal and professional lives). The project included several compulsory activities, the others were optional, and students took part in them only after the problematic area data analysis. This paper will present these activities, methodology as well as the chosen research problems that the students worked on. In the second part of the paper Barbara Nedvídková (the co-author of this paper) presents her working with stress in different phases of the action research. Both the benefits and limits of this paper are concluded at the end.

2 Students project introduction

The principal goal of the pregradual education of teachers is the development of key competencies. The method of lectures and presentation does not seem to be the most effective form for gaining these competencies. Most authors think that they can only be adopted by experience, training, and targeted communication development (eg. Lleó et al., 2017). The student project consisted of several elements with the above-mentioned emphasis, which formed the basic program that the involved students participated in. Furthermore, they worked on their own

individual action research focused on their needs of personality and social development. They identified their needs after taking part in the programme and analysing the information gained by data collection.

The main programme included a week-long self-experience stay in the role of a client of a therapeutic community for drug addicts, participation in five focus groups focusing on personality development, a session with a psychologist and counsellor both in the therapeutic community, at the university or in another facility, and targeted interviews with close people and writing a personal action research journal. The students reflected their experience with a personality or social situation in their lives, they reflected their engagement in individual parts of the programme. Writing the journal and practice reflection is a way how a teacher can access their own personality development and get feedback from their practice (comp. Walker-Floyd, 2011).

Each student chose two to three key issues based on the categories which rose from the journal analysis, then they worked with them in action research cycles. During two years of action research, six key development issues were identified: communication skills improvement, self-value and self-trust strengthening, strain situation management and work with escape strategies, skills to deal with conflict situations appropriately, diminishing fear of facing new situations and work with negative judging of other people.

„Improving the communication skills includes also some narrowed research problems such as fighting the fear of speaking in front of other people and the ability to communicate negative feedback and improvement in counselling sessions management. All these issues were interconnected not only by the student personal needs but also by the need of developing teachers' competences.

The issue “Self-value and self-trust strengthening” was narrowed so that it was realistic to work with it within the time limit of one semester. Mertler (2006) suggests that if the issue is not narrowed, the work can be demotivated for the researchers and the progress is hardly observable. The narrowed topics included research problems focused on safety needs, realizing strength and strengthening self-value, professional boundaries, and working with emotional self-acceptance.

The students defined two escape strategies in the area of “Coping with strain situations and work with escape strategies” in the first year. The strategies emerged from the analysis of personal journals. During the individual action research, they decided to work to escape the strategies of crying and illness. Work on stress, emotion, procrastination, and hopelessness was covered in the second year.

The fourth topic “Gaining the skills of appropriate dealing with conflict situations” proved to be common for all students in the first year of the research. Two of them chose the narrowed topic work with emotions and constructive arguments.

“Diminishing the fear of facing new situations and improving the process of adaptation in the new environment” was chosen by one student. The possibility to involve in the therapeutic community in the role of client provided the possibility to test new strategies in the Action phase. The last identified issue “working with negative judging of other people” revealed close connections with self-acceptance and self-evaluation.

The data collection method that the students used in “Communication skills improvement” was feedback from other student close people but also from the clients of the therapeutic community where they were involved in the role of clients during the first stage of the treatment. Literature, which is well accessible in the Czech environment, helped them to make

development plans. In the “Action” phase, they used a large range of cognitive behavioral techniques and already after the first action research cycle they noticed progress and improvement which was reflected by their environment.

In the area of “Strengthening self-value and self-trust” the students used discussions in focus groups aimed at personality development. They gained valuable feedback during this week of intense self-experience internship in the therapeutic community for drug addicts. They could reflect their thoughts in a personal action research journal.

As for the area “Defining personal boundaries” one student made a note in her journal that when she tried to define her professional and personal boundaries, she admitted she had a problem in this field. She started to think about the situation she was facing. As it was a short-term period, the close people feedback analysis did not monitor any significant changes. The progress remained only on the level of student’s personal perception (personal journal notes analysis.).

Following the analysis of their personal journal notes, two students realized what their escape strategies from the strain situations are. One of them escaped into crying, the other one into illness. Both students used an analytical approach. They returned to the situations that they had experienced before and took notes in their journals. The student distinguished between different types of crying when analysing her escape into crying. She realized that she does not want to use the manipulative cry any more. Part of the action research cycle work was identifying the situations when she uses this type of crying and its refusal as soon as she understood this behaviour strategy. On contrary, the cry, which is characteristic for the student and which completes her emotional experience was accepted by her as part of her personality and individuality. The student presented the outcomes of this individual research in her thesis defence (Hutyrová, 2020).

Two students analysed conflict situations and their coping. Both described their dissatisfaction with their behaviour in these situations. The conflict did not enable them to experience stress relief but triggered depressive and melancholic moods which they did not see a way out from. After careful analysis, both students used the constructive argument theory by Kratochvíl (2009) and tried to apply it in practice. They involved their partners in the “Action” phase and tested the theory principles with them. In case of one of the students coping with difficult situations led to crossing personal boundaries and disturbing self-respect.

Literature was the valuable means in perceiving the worsened adaptation in the new environment and leading to the possibility of its improvement. The students took advantage of this to create developing plans and chose the activities that she applied and reflected.

3 Methodology

There is a number of action research models (eg. Richterová et al., 2020). The action research model according to Kemmis, McTaggart (1988) and Seymour-Rolls, Hughes (1998) was chosen to carry out individual action research focused on personality and social development. This model consists of four phases. It was chosen for its simplicity and comprehensibility and for its flexibility and efficacy of the phases corresponding to the chosen issue. This type of research enables to end the research in any cycle which was an important deciding factor. Not every cycle must necessarily end with the last ie. fourth phase (Willis and Edwards, 2014). Every action research model highlights not only the possibility of working in cycles, but also in a spiral. It is advisable to go through the cycle several times and bear in mind the constant need of improvement and evaluation. It is also important to end the research in the given time (Willis and Edwards, 2014).

Individual action researches conducted in this project were based on an interpretative paradigm which influences the research

problem choice, data collection method, and their analysis. It defines the output interpretation and work with results. Gained results cannot be generalized but are only valid for the researched situation in the given context (Willis and Edwards, 2014).

The first phase of the action research in this model is called Reflection. In this phase, we gather information about the issue. A broad research problem is set and further it is gradually narrowed down. The researcher is the researched person at the same time in a large number of individual action researches. This is the reason it is important to involve other people, eg. other people reflection or psychological test application, etc.

The second phase is called Plan. The essential part of this phase is exploring how to tackle the problem and create the so-called developing plan. This happens based on the collected data and information analysis. Making a plan and theory is an essential part of this phase as it will encourage innovative ways of tackling the problem. The researcher should not take over a theory that somebody has already come up with, but they should be inspired and apply it to their needs.

The third phase is Action. The plan or theory which was made in the previous phase is applied in this phase. The authors call the last phase Observation. The change is observed, evaluated, and reflected. Data and information are collected again. These can be both qualitative (eg. unstructured observations or semi-structured interview) or quantitative (eg. questionnaire, psychological structured test). Qualitative interpretation without any generalization is important in our case. Reflection helps to describe the progress which was made. Ideally, the results of one cycle should lead to starting a new cycle where a new developing plan and its application and evaluation happens. Only rarely are the initial changes sufficient improvements, and changes should be made (comp. eg. Willis and Edwards, 2014).

To ensure validity and reliability, several data and information collection methods were used in the individual action research. The so-called triangulation of data collection method occurred. Personal action research journal was the main research method. The term “personal action research journal” (PARJ) came to life during Walker-Floyed research work (2011). The author focused his work on his teaching practice, he analysed his professional experience while taking notes, later he included his colleagues professional experience too. New theory was formulated and used in practice by teachers and followingly evaluated. PARJ requires that the researchers test new theories choosing innovative processes. Furthermore, they are assessed for their purposefulness (Willis and Edwards, 2014). Open coding, categories forming, and sometimes topic analysis were used to analyze the students’ journals.

The questionnaire Scale of Psychological Wellbeing was an important research method. It is a standardized questionnaire made by Carol Ryff. The questionnaire can be divided into six dimensions of mental well-being: self-acceptance, positive relations with others, autonomy, purpose in life, environmental mastery, and personal growth (Ryff, 1989). The students involved in the project completed the questionnaire twice, and their close people did the same. For the first time, they filled it in when entering the project, for the second time after finishing the individual action plan. A project psychologist analysed the questionnaire and provided the students with feedback which they reflected in PARJ.

Other methods used by students were their own questionnaires and interviews. The interviews were mostly semistructured, they completed the data collection with chosen issues and research problems that the students addressed. The interviews were led with close people, classmates, workmates, therapeutic community workers, and clients. The interviews were recorded, transcribed, and analysed by means of open coding.

Focus groups were used as the intervention method. Some students used focus groups as an intervention method. Focus groups’ issues were chosen by the group moderator or they were

voted for by group members. Video recording was made from the focus group sessions. All involved students had access to the recording regarding the research problems, parts of the focus groups were transcribed and analyzed by open coding.

Individual phases and action research cycles were narrated by the students. The narration is based on authenticity when each narrator chooses a different narration structure. Narration is a technique which takes over some tools from other scientific disciplines, such as linguistics and its metaphor use, etc. (in Švaříček, Šedová et al., 2014). Another chapter defines the research problem and work in action research cycles as it was registered by Barbara Nedvídková.

4 Work with stress – work in action research cycles

The student took notes in the PARJ about all the situations which led to her dissatisfaction with her behaviour during the three months. The notes coding and categorization followed. The category “My work with stress” was significant. The student worked with this category in her work in individual action research phases and cycles. She starts her description with defining the research problem and tries to set it in wider circumstances. Research questions follow, she focuses on them in all the action research phases.

The word stress is known to everybody, its presence constantly increases. One of the indicators is the growing number of antidepressants use in the Czech Republic and has become a common problem at this time: “...the most tragic impact is on those individuals who do not speak about stress and make a considerable effort to mask it” (Novák, 2004, p. 77).

“Using my self, my personality as a therapeutic tool” is important in helping professions (Mátel, 2019, p. 150) incl. social work “...it is important that the social worker can use and cultivate his personality, his self when doing social work” (Mátel, 2019, p. 104). Getting to know one’s self, self-acceptance are important parts of the process as a basis for self-respect (Mátel, 2019, p. 104).

The aim of my research is to determine which techniques and work processes help me to cope with stress situations better. In the Reflection phase, I am going to find the most common stressors and see which ones occur with me most frequently. I am going to use psychological tests and analyse the PARJ. I am going to focus on partial research questions: What are the most frequent situations stressing me? What are my physical and mental responses to stress? How sensitive am I to stress?

The Journal analyses will help me to find answers to the first two partial questions. The answer to the last formulated partial research question in the Reflection phase will be found by means of the standardized psychological test “Coping strategy” (Nowack, 2006) and Myers-Briggs type indicator (MBTI).

In the Plan phase, I am going to analyze the literature and seek new possibilities of techniques and processes of coping with my stress. I am going to test these techniques in the Action phase. Observation phase will help me to find changes and behavioral progress and experience in stress situations.

4.1 Reflection phase

Stress was the very first issue in the first record in PARJ. I am going to describe a situation which I was facing at work and I later classified it as the most frequent stress evoking situation. “What if they ask me something? What if they tell me a joke which I will not understand? What if they ask me about something from life?” (D1, 1g – code: Conversation with a director creating stress). Stress does not occur only at work, but there is often time pressure at work or school, which I classify among the most frequent situations creating stress. I am going to present an example which illustrates the above mentioned. “They automatically thought that I had passed the test and therefore my brief response no was taken for a joke. In my

thoughts I laughed ironically, at the same time I cast anger towards my colleague, mainly Veronika who has been the newest among our colleagues, she attends very spontaneously and moreover it is necessary to do the work for her” (D6,4i - code: Sarcasms covering anger/sadness due to failure.). Another stress evoking situation was when something unexpected happened. As an example, I will cite my PARJ notes about my father’s visit to the hometown after I have not seen him for many years. “When I was calling my Mum, I started crying. On one hand I felt sorry, on the other hand I was upset. I did not want to be weak, it was all supported by the unexpected which always leads to stress and nervousness” (D4, 3i – code: fear, anger, and uncertainty manifested in cry). I would like to mention my test results from Myers Briggs Type Indicator (MBTI) where my personality type was ISTJ. This is closely connected with my finding noted in the PARJ. These people “need firm plans, clear instructions, and understandable goals. Under these conditions, they are the most effective. Unknown things and uncertain future can trigger stress in them.”

To demonstrate my physical and mental responses to stress, I will quote several sentences from my journal. “Stress, anxiety, the regular need for going to the bathroom come in small, gradually increasing doses, unstoppable trembling makes me nervous and upset” (D3, 2e – code: anxiety, bathroom going and trembling as stress symptoms). “...along with fear and anxiety I am trembling, my limbs do not fill with blood ...” (D3, 2i – code: Cold as a stress symptom.). I noticed the following in my work environment: “After she left, my heartbeat was so fast that I was thinking it could jump out and slap me for stress ...” (D8, 2g – code: palpitation/thoughts as response to shame).

My sensitivity to stress can be seen in the questionnaire. The results of MBTI say I am an introvert but I present myself as an extrovert. The ISTJ type can programme themselves because of their extrovercy, although loneliness is comfortable being in a company is a pleasant change and relaxation for me. This is conditioned by certain rules which are: a small number of people, close people, suitable repetition in the right timing is in free time. If we want to give an example from the journal, we can mention meeting the psychologist for the first time, here I demonstrate the stress of meeting a stranger “...there were only two of us, I was getting red in face ...”, “...I was on the verge of hysteria ...” (D10, 2c – code: Inner panic evoked by the unknown.). The results of the Stress profile questionnaire (Nowack, 2006) helped me to understand which coping strategies I resort to and which I should learn. Score 60 T and up represents frequent use of the strategy and vice versa the score 40 and lower represents minimum or missing skills in strategy use (Nowack, 2006, pp. 25-26). I had the highest score 73T in the field of Negative Appraisal. “People using this strategy come to terms with this issue when they concentrate on the worst aspects or possible consequences” (Nowack, 2006, p. 25). On the contrary, a very low score can be found in mental well being 27 T and 33 T threat minimalizing. The similarity with life experience clearly shows which strategies are strong, helpful and which are beneficial to learn and improve.

4.2 Plan phase

There are countless possibilities and techniques how to cope with stress, I chose the following authors Paulík (2010), Šauerová (2018), Praško and Prašková (2001), Mühlfeit and Costi (2017). Coping strategies can be divided into cognitive-behavioral approach and strategic approach and relaxation – active and passive approaches.

Cognitive-behavioral techniques are, for example, trivialisation which is demonstrated by an example: “I will say to myself: It is not that bad!” (Praško and Prašková, 2001, p. 66) and distract “think about something else” (Praško and Prašková, 2001, p. 66). My thoughts, ideas, and preparations often result in physical and mental stress. I would like to try to push these thoughts away and these strategies are possible tools. Praško and Prašková (2001) recommend to avoid automatic negative thoughts, but my score in the Stress profile questionnaire

(Nowack, 2006) was 73T in the field of Negative Appraisal. When we put the facts together, my best strategy results in "...postponing unpleasant things, giving up on things, resignation and sadness, and feelings of helplessness. Generally, they are overrated and evaluate themselves, their environment or future negatively". (Praško and Prašková, 2001, p. 23). I decided to focus on the Negative Appraisal in the Action phase using the above mentioned techniques.

When studying the detailed plan for overcoming stress by Praško and Prašková (2001), we come across the strategic approach. It includes seven points and can be completed by Paulík (2010). The important thing is to get rid of inconvenient habits such as "creating excessive pressure on oneself by stressing what we have to do or what we must not do" (Paulík, 2010, p. 185). Active and passive relaxation can be used in prevention form or fight against stress as they eliminate natural stress hormones and metabolise energy accumulated by stress (Praško and Prašková, 2001, p. 61).

One of the most important and often overlooked strategies is sleep. It is a passive form of relaxation which requires keeping certain rules. The rules can be found in Paulík (2010), Mühlfeit and Costi (2017) who claim that, "...The more stressful our life is, the more sleep we need" (Mühlfeit and Costi, 2017, p. 240). As the quality sleep strategy occurs in many publications, I am going to focus on it and observe it in the action phase. Yoga is also among the relaxation techniques. It is considered "lower personality components shrinking and elucidation – consciousness cleansing (átman) identification with absolute ultimate knowledge (brahma)" (Paulík, 2010, p. 195) and it is "the basis of some other relaxation techniques (eg., autogenic training, progressive muscular relaxation)" (Šauerová, 2018, p. 141). I find her multifunctionality attractive, I am going to watch if there are any changes in the regularity of stress occurrence, when leaving it out or when it is absent. According to Paulík (2010), Mühlfeit and Costi (2017), there are countless benefits of movement. Šauerová (2018) states that "...movement affects psyche anxiolytically, antidepressively and it helps to unwind" (Šauerová, 2018, p. 77). The last strategy in the action phase will be movement as I am fond of movement and I am interested to learn if this strategy is effective.

4.3 Action Phase

Chosen strategies were tested from May 2020. I expected that downplaying will lead to suppressing negative thoughts when I push positive thoughts forth in their place. Unfortunately, the opposite was found through reflection and I noted it down in the journal. "...I deliberately used it, but unintentionally I overlaid it by imagining the situation and that was a mistake" (D21, 6u – code: unintentional overlaying of "downplaying" strategy by imagining an ideal encounter). "The downplaying strategy had no chance to succeed, but it helped me to understand that imagining the ideal leads me into even greater stress. Playing the encounter, I am getting myself into a stressful situation and therefore the negative body and mind responses get worse" (D21, 6v – code: Realizing negative impact and stress encouragement when playing the stressful situation). This fact was confirmed when using the same strategy two months later. "The downplay strategy which was used to welcome others in the meeting room was followed by stress what I am going to say. I cannot say that the results of my behaviour are only thanks to the strategy. The speech was neither terrible nor calm, and worse reset might have been caused by thinking about the contents of my speech" (D25, 8z – code: thoughts, ideas as a cause of unused potential of the downplay strategy).

The downplay strategy as well as distraction should have relieved and minimized stress. The principal was to think about something else and distract attention from stress manifestations. This was the greatest success. The same day when I used the downplay, I also used the attention distraction strategy. "The second strategy used the same day was the distraction of attention. It was used correctly and was not influenced by anything. The stress was relieved and the body and mind were

progressed into the situation where they could not respond." (D25, 8ab – code: OP strategy's use by minimizing stress and moving on). It repeatedly met my expectations and I also realized its short life. "We had to adopt fast in the situation we found ourselves in and act. There was no time to stress out" (D25, 8ac – code: OP strategy leading to inability to respond to stress). I adopted to it and learned how to act. "At the time when the body calms down, it is time to face what scares us or progress somehow. Before our mind starts to occupy itself with something and before it starts all over again" (D23, 6r – code: Short term OP strategy leading to fast moving on). The initiative was an unexpected side effect of the strategy.

I will mention two key findings. Firstly, that the most effective distraction of attention is speaking to the person as it occupies all our senses. Focusing on the person is not the same thing although. "Her presence absorbed me and I concentrated fully on her. On her needs, communication and adaptation course" (D30, 1g – code: Nela's presence as the most intense during OP strategy). Second finding is the bias. It is important to be totally absorbed so that negative thoughts are efficiently suppressed. I realized it and had to change the strategy. "...If it is insufficient, there must be a change made or something must be added. I had to make a porridge and watch a video, just porridge was not enough" (D30, 3u – code: Insufficient involvement leading to subconscious stress comeback.).

Other techniques to fight stress were yoga, exercise, and sleep. These are activities which occur together with prevention, but they are difficult to spot as for their efficiency and influence. The regularity in practicing yoga since May brought the finding that breaking the routine can lead to another issue: Response in heat of passion and sleep can hardly be documented. As for exercise in one of the journals, I came to the conclusion "that movement is helpful to relieve stress, but in my case, it is not about regular exercise requiring concentration on movement and muscles" (D28, 5y – code: Rhythmic exercise leading to stress relief). Another finding was "...that I cannot destress by moving in the situation when coping with the difficult situation is within reach" (D28, 5z – code: The unsolved dilemma which can be coped with immediately is not solid by exercise.). "First, I have to cope with it so that it does not keep provoking in my head and then I exercise to get rid of tremble, excessive energy, stiffness. In this case I do cardio with music. Just rhythm and movement." (D28, 5aa – code: Rhythmic activity drives trembling and stiffness away.). My last strategy was avoiding negative thinking. I used it assuming that when I realize that negative thinking increases my stress, then I win over my emotions, the opposite turns out to be true. "Avoiding negative thinking such as „I am totally impossible how I tremble I will have my intestines bubbling I will be flatulent, I will be in pain and will be forced to relieve myself, I am not able to lie for four hours without faux pas..." this is difficult as the authors of the book Proti stresu krok za krokem. I only supported my stress by this" (D23, 2c – code: Confirming the negative which strengthens stress from negative thinking).

4.4 Observation Phase

I am going to evaluate the techniques I chose in the following part, they come from individual action research journal In the Observation phase other data collection methods were used to increase the validity.

I consider attention distraction to be the most successful. The honesty in repetition enabled using the technique and revealed the negatives and strengthened the positives. The initiative is a side effect as it is very low in my case which is confirmed by the Psychological Well-Being Scales (Ryff). I had score 8 in the Autonomy dimension (AU) in January 2020, the population average was 15,2. "...The first time the result surprised me. As soon as I could, I jumped from the technique right into speaking" (D27, 6x – code: Surprising initiative after using OP technique). Initiative acting a month later can be considered a success, as it led to personality development. At that time, I was participating in the therapeutic community FIDES, where I used

my questionnaires. Closed questions were assessed on a bipolar scale “I seem to be stressed” up to 7th grade “I do not seem to be stressed” the average answer was 4.7. When comparing stress perception and inner feelings, they contradict each other. “Already 10 minutes before arrival I felt anxiety, my stomach was in knots, my intestines were moving, my mouth and lips were dry. I started trembling, my feet were cold and I started to speak as the arrival was getting close ...” (D25, 1b – code: Starting stress in the form of anxiety, stomach in knots, intestines, dry mouth, cold feet, and ridiculous laugh). I think we can partly attribute the difference to the technique and partly to the unconscious strength caused by the contact with a close person. “When near Nela it was not so unbearable. She calmed my mind and gave me a feeling of the familiar. She brought in certainty, stability, and memories of home” (D26, 6m - code: Nela bringing peace, safety, stability, and memories of home). Furthermore, I found that the important part is also the intensity of involvement, the most effective of which is a close person. We have to count with short-term effect so “When the body calms down we have to face what scares us or progress somehow. We have to do it before our mind fills with the same and it all starts over again.” (D23, 6r – code: Short term OP technique leading to stepping forward.).

The *downplay* technique had short-term effects just like the above mentioned, *attention distraction* technique. Its principle was to suppress negative thoughts and replace them with positive ones. I noted down in my PARJ: “learned, rigid behaviour won” (D21, 4p – code: The downplay technique is not able to suppress stereotyped behaviour.). Using both techniques showed that my strongly negative appraisal of things (see the Stress Coping Strategy test results) cannot be overcome just by using cognitive-behavioral techniques.

My other techniques were sleep and yoga. I underestimated the analysis except short notes in my individual journal. Their contribution can be neither confirmed nor disproved, nonetheless I have no doubt about their importance. The last to be evaluated is the exercise. Wholesome effects mentioned in the literature and the positive attitude to movement convinced me to try it. To sum up “*Cardio with music is definitely a good way to relieve stress*” (D28, 3u – Cardio with music is definitely a good way to relieve stress), “*but concentrated exercise is not. It strengthened my stress ...*” (D28, 3v – Concentrated exercise with elements of heat of passion finished by a shower). I also found out that unsolved inner conflict cannot be avoided, that is “*It’s a real pain until I push it away*” (D28, 4x – code: It is a real pain until it is solved.) and then I can relieve the stress by exercise.

5 Conclusion

It is important to conclude with the limits of individual action research focused on personality and social development. One of the benefits but at the same time limit is the role of the researcher and respondent in one person. The student in the role of the researcher considers data collection methods which will be the least burdened by one angle of view and will make studying the reality possible. In the moment of qualitative data analysis, personal experience and individual students’ view of the world enters the process. Although the analyses of the interview or tests reveal new realities, the student includes their reality perception in the qualitative interpretation. On the other hand, the benefit of this research is student’s motivation to get involved in the issues which they regard important for themselves as they are interested in improving the reality. The impossibility to see and perceive certain things which remain hidden is a limitation. Although all students tried to triangulate the data collection method and their analysis, this needs to be mentioned as a limit too. Personal action research journal was the key method for all students. Interviews with close people or clients in the therapeutic community enabled to complete information for “Reflection” and “Observation” phases. Quality data collection tools such as pretests and posttests would be needed to state unequivocal progress.

One of the most beneficial progress of the research is the personal narrowing of the research of each student on their own issues. The two-year project proves the need and interest of students to improve their competencies in social and personality development. The concept of general study plans of individual programmes gains new dimensions focused on the development of the needs of each individual student.

Literature:

1. Hutyrová, M.: *Akční výzkum jako nástroj osobnostního a profesního rozvoje*. Master thesis. Ostrava: Faculty of Education, University of Ostrava, 2020. 112 p.
2. Kemmis, S., McTaggart, R.: *The Action Research Planner: Action research and the critical analysis of pedagogy*, 3rd edition. Geelong: Deaking University Press, 1988. 154 p.
3. Kratochvíl, S.: *Manželská a párová terapie*. Praha: Portál, 2009. 280 p. ISBN 978-80-7367-646-9.
4. Lleó, A. et al.: Mentoring Programme based on Competency Development at a Spanish University: An Action Research Study [Online]. *European Journal of Engineering Education*, 43(5), 2017, 706-724. <https://doi.org/10.1080/03043797.2017.1415298>.
5. Mátel, A.: *Teorie sociální práce I: sociální práce jako profese, akademická disciplína a vědní obor*. Praha: Grada, 2019. 208 p. ISBN 978-80-271-2220-2.
6. Mertler, C. A.: *Action Research: Teachers as Researchers in the Classroom*. California, USA: Sage Publications, 2006. 250 p. ISBN 0-7619-2844-8.
7. Mühlfeit, J., Costi, M.: *Pozitivní leader: jak energie a štěstí pohánějí špičkové týmy na cestě k úspěchu*. Brno: Management Press, 2017. 368 p. ISBN 978-80-265-0591-4.
8. National Accreditation Bureau. *Doporučené postupy pro přípravu studijních programů*. Praha: NAÚ, 2017. 48 p.
9. Novák, T.: *Jak bojovat se stresem*. Praha: Grada, 2004. 139 p. ISBN 80-247-0695-4.
10. Nowack, K. M.: *Stress Profile*. Praha: Hogrefe - Testcentrum, 2006.
11. Paulík, K.: *Psychologie lidské odolnosti*. Praha: Grada, 2010. 240 p. ISBN 978-80-247-2959-6.
12. Praško, J., Prašková, H.: *Proti stresu krok za krokem*. Praha: Grada, 2001. 201 p. ISBN 80-247-0068-9.
13. Richterová, B. et al.: *Akční výzkum v teorii a praxi*. Ostrava: Pedagogická fakulta Ostravské univerzity, 2020. 199 p. ISBN 978-80-7599-176-8.
14. Ryff, C. D.: Happiness is everything, or is it? Explorations on the meaning of psychological well-being. [Online]. *Journal of Personality and Social Psychology*, 57(6), 1989, 1069-1081. <https://doi.org/10.1037/0022-3514.57.6.1069>
15. Seymour-Rolls, Hughes, K.: *Participatory action research: Getting the Job Done* [Online]. Retrieved March 13, 2020, from <http://www.aral.com.au/arow/rseymour.html>. 1998.
16. Švamberg Šauerová, M.: *Techniky osobnostního rozvoje a duševní hygieny učitele*. Praha: Grada, 2018. Pedagogika. 280 p. ISBN 978-80-271-0470-3
17. Švaříček, R., Šedová, K. et al.: *Kvalitativní výzkum v pedagogických vědách*. Praha: Portál, 2nd edition, 2014. 384 p. ISBN 978-80-262-0644-6.
18. Walker-Floyd, L. K.: *A Narrative Study of how an Online Practitioner used a Personal Action Research Journal as a Form of Professional Development*. Ann Arbor: ProQuest, 2011.
19. Willis, J., Edwards, C. L.: *Action Research: Models, Methods, and Examples*. Charlotte: Information Age Publishing, 2014. 332 p. ISBN 978-1-62396-655-3.

Primary Paper Section: A

Secondary Paper Section: AM

COPING STRATEGIES AND MENTAL TOUGHNESS IN SPORTS SCHOOL STUDENTS

^aMARTINA ROMANOVÁ

Institute of Applied Psychology, Constantine the Philosopher University in Nitra, Kraskova I, Nitra, Slovak Republic
email: "mromanova@ukf.sk"

Abstract: Coping strategies in general reflect the set of responses to the stress that people can use. In sport context coping strategies are viewed as ways of minimizing an athlete's level of perceived stress before a competition. Mental toughness refers to the repertoire of psychological characteristics which are crucial to optimal performance. The objective of the study was to examine the relationship between the above mentioned concepts. The sample consisted of 50 pupils from High School for Athletes. Coping strategies were identified by using The Athletic Coping Skills Inventory 28 (ACSI-28) and to identify mental toughness Sports Mental Toughness Questionnaire (SMTQ) was used. The results indicate a significant and positive relationship between mental toughness and coping strategies, mainly between confidence (the dimension of mental toughness) and several coping strategies (dealing with difficulties, concentration, confidence, maximizing performance under pressure).

Key words: coping strategies, mental toughness, sport, stress.

1 Introduction

Stress in general is a normal response or reaction to problems or tensions. For many years the researchers have been trying to formulate an acceptable definition of stress. A scientific way to conceptualize it is to look on it as a process by which people perceive and subsequently react to situations that are appraised as threatening or intolerable to their well-being (Lazarus and Folkman, 1984). There are many ways people use when coping with stress (Sollár, Sollárová, 2009; Sollárová, Sollár, 2010). The effectiveness of them is influenced by some factors, such as the individual, the type of stressor but also the circumstances (Solgajová et al., 2015, 2017; Sollárová, Sollár, 2013). Lazarus and Folkman (1984) defined coping as the behavioral and cognitive efforts to manage demands (external and internal) which people typically face in stressful situations. A large amount of studies used the distinction of coping proposed by Folkman and Lazarus. They suggest that there are two basic functional dimensions of coping. The task-oriented coping reflects the steps or activities people use in order to change the stressful situation or its separate aspects. Two basic strategies that belong to this dimension of coping are: logical analysis or increased effort. The emotion-oriented coping is the second dimension and it reflects all ways or activities people use in order to modify or change the meaning of a difficult stressful situation. Later, the third dimension of coping appeared in scientific literature. It was labelled as the avoidance-oriented coping (Carver, Scheier, and Weintraub, 1989). This type of coping reflects the behavior oriented to redirecting attention to such aspects of the task or situation that are not relevant. It involves several strategies, mainly denial, substance use or behavioral disengagement.

Being physically active has become very popular over recent years. Broďáni and Kováčová in their study (2019) confirmed that organized races and training in which high school athletes participate, increase the frequency of positive reactions between their physical activity and physical and spiritual well-being. Sport in general is viewed as an inevitable part of our life and a component of a healthy lifestyle which includes also successful dealing with difficult life situations and various problems. In sport context, coping with stress and unpleasant situations is highly important for athletes. They learn how to overcome or eliminate stress or anxiety and at the same time to control their own emotions. The most frequently used coping strategies in sport settings involve social support seeking, problem-solving, planning, increased effort, relaxation or arousal control (Nicholls, Polman, 2007). All of the mentioned strategies and also many others create an athlete's self-regulation base that enables effective adaptation in stressful situations. It is suggested that coping strategies in sport can be associated with several psychological variables such as: self-efficacy, trait and state anxiety, motivational climate or perceived control. The concept of coping in sport environment has become frequently discussed

by many professionals (Bahramizade, Besharat, 2010). It distinguishes between approach coping style and avoidance coping style. The first one, approach coping style is defined as conscious actions or concentration to stressful situation while actively trying to manage or reduce it. In scientific literature it is described as vigilance, attention, or engagement (Anshel, 2001). When using this approach, athletes' responses to stress vary from task-oriented coping, time management to goal concentration (Amiot, Gaudreau, & Blanchard, 2004; Gould, Eklund, & Jackson., 1993). On the contrary, the avoidance coping involves mainly psychological (keeping cognitive distance) or behavioral (keeping physical distance) withdrawal from the stressful or unpleasant situations (Krohne, 1993; Kowalski & Crocker, 2001). It is also labelled as disengagement or desensitization. In 2001 Yoo proposed another type of coping frequently used by Korean athletes which is transcendental coping. It reflects the absence of material wishes and expectations. It might be viewed as very similar to avoidance coping but athletes do not apply stress avoidance or denial when dealing with difficult or demanding situations.

Another concept that has been frequently discussed and used mainly when evaluating sport success or achievement is mental toughness. This unique inner strength which helps athletes overcome their fears and doubts is defined by Loehr (1986) as an ability to use one's own potential in all possible situations. His books are very influential though they were published some decades ago. He suggested the model of mental toughness which was based on his clinical practice and experience. The model consisted of seven factors: motivation, self-confidence, attitude control, attention control, visual and imagery control, positive energy, and negative energy. In 2002 Clough and his associates decided to include experiences from athletes and coaches into some principles and conclusions from research on hardiness (defined as the personality construct consisting of three dimensions: control, challenge and commitment) and one research study was related to physiological adaptation to stress. As a result, they proposed the four components model of mental toughness (the 4Cs model): confidence, control, challenge, and commitment (Clough, Earle, & Sewell, 2002). Later on, Clough and his associates extended the 4Cs model so that two components (control and confidence) were better conceptualized (Vaughan, Hanna, & Breslin, 2018). Thus, the model could display four or six separate components: challenge, commitment, control of emotions, control of life, confidence in abilities, and interpersonal confidence.

Jones (2002) comparably claims that mentally tough athletes are determined, self-confident, and predisposed to have control over their behavior and emotions when being under pressure. In their research, Gucciardi, Gordon, & Dimmock (2008) tried to explore the holistic understanding of mental toughness in Australian football players. Three key categories were derived and integrated into the proposed model and emphasized the relationship between these key categories which were: behaviors, characteristics and situations. Cowden (2017) in his work emphasizes the perspective that this specific quality should be taken into consideration and examined in athletes since it has a crucial role in promoting adaptive responses to stressful sport situations and events. Mental toughness is frequently perceived as a multifaceted concept associated with athletic performance and which enables athletes to succeed in sport. Due to the growing research a lot has been examined and discovered in this area but still it is not clear whether mental toughness is reflected more in sport achievement or in factors which have the potential to promote positive psychosocial reactions to changing conditions (Cowden, 2017). In general, we can conclude that mental toughness can be viewed as a skill that is associated with self-confidence and resilience which in turn can affect success in sport.

The relationship between coping strategies and mental toughness in sport

Nicholls and Polman (2007) claim, that the relationship between coping strategies and mental toughness is clear but to support this prediction no relevant research has been carried out. It is expected that athletes who are mentally tough are able to cope effectively with difficult situations (Jones, Hanton, & Connaughton, 2007; Thelwell, Weston, & Greenlees, 2005). In national context this relationship has not been explored yet, thus we decided to focus on mental toughness in relation to coping strategies in sport school students.

2 Methods

The study participants were pupils (N=50) from High School for Athletes in Nitra, aged from 18 to 19. We chose this age group because athletes between the ages of 16 and 19 years are more future concerned than their non-athletes' peers (Broďáni, Šiška, Kováčová, 2018), thus behaving in a responsible way towards their career. The sample consisted of 29 boys and 21 girls, all of them were the students of the fourth grade who have been actively engaged in athletics for more than seven years. Two measurement tools were administered to participants. To identify coping strategies, The Athletic Coping Skills Inventory (ACSI-28) was administered. It is frequently used and highly validated assessment of psychological coping skills among athletes. The ACSI-28 was developed by Smith et al. (1995) and it consists of seven subscales: coping with adversity, peaking under pressure, goal setting and mental preparation, concentration, freedom from worry, confidence and achievement motivation, and coachability. To measure mental toughness, The Sport Mental Toughness Questionnaire (SMTQ) was used. It is a self-report questionnaire and it consists of 14 items. It provides a total mental toughness score, and also scores on three subscales: confidence, control and constancy. Respondents reply on a four-point Likert scale. The questionnaire has acceptable construct validity and internal consistency (Sheard, Golby, & Van Wersch, 2009).

3 Results

a) Relationship between coping strategies and mental toughness

Table 1 Relationship between coping strategies and mental toughness (N=50)

	Mental toughness	
	r	p
Coping strategies	.45	.001

Note: r - Pearson's correlation coefficient; p - p value

As seen in the Table 1 we can conclude that there is a positive significant relationship ($r=.45$, $p<.001$) between coping strategies and mental toughness in adolescent athletes.

b) Relationship between coping strategies and component confidence

Table 2 Relationship between coping strategies and confidence (N=50)

	Confidence	
	r	p
Coping strategies	.50	<.001
Coping with adversity	.30	.040
Coachability	.23	.110
Concentration	.31	.030
Confidence and achievement motivation	.50	<.001
Goal setting and mental preparation	.18	.210
Peaking under pressure	.39	<.001
Freedom from worry	.15	.290

Note: r - Pearson's correlation coefficient; p - p value

As it can be seen in the Table 2 there is a positive significant relationship between coping strategies and the confidence factor ($r=.50$, $p<.001$). The same results can be identified also in the relationship between confidence and two separate coping strategies: confidence and achievement motivation ($r=.50$, $p<.001$) and peaking under pressure ($r=.39$, $p<.001$). A weak positive relationship was identified also between confidence and two coping strategies: concentration ($r=.31$, $p<.05$) and coping with adversity ($r=.30$, $p<.05$).

c) Relationship between coping strategies and component control

Table 3 Relationship between coping strategies and control (N=50)

	Control	
	r	p
Coping strategies	.24	.090
Coping with adversity	.21	.140
Coachability	.18	.210
Concentration	.22	.120
Confidence and achievement motivation	.25	.090
Goal setting and mental preparation	-.05	.740
Peaking under pressure	.21	.140
Freedom from worry	.05	.690

Note: r - Pearson's correlation coefficient; p - p value

Based on the results from the Table 3 we can conclude that there is no significant relationship between coping strategies and the component control. In all of the separate coping strategies the same finding was identified. None of the coping strategies was significantly correlated ($p>.05$) with control, as the component of mental toughness.

d) Relationship between coping strategies and component constancy

Table 4 Relationship between coping strategies and constancy (N=50)

	Constancy	
	r	p
Coping strategies	.18	.220
Coping with adversity	.00	.990
Coachability	.37	<.001
Concentration	.19	.170
Confidence and achievement motivation	.21	.130
Goal setting and mental preparation	.01	.970
Peaking under pressure	.05	.740
Freedom from worry	.02	.890

Note: r - Pearson's correlation coefficient; p - p value

The findings, as seen in the Table 4, indicate that there is no significant relationship between coping strategies and constancy as the component of mental toughness in pupils of high school for athletes. Only the coachability and constancy were positively correlated ($r=.37$, $p<.001$). Other coping strategies do not correlate with the constancy component ($p>.05$).

4 Discussion

a) Relationship between coping strategies and mental toughness

In the submitted study we found out some significant relationships between mental toughness and coping strategies in pupils of the high school for athletes. Also the study of Nicholls et al. (2008) revealed highly significant relationship between these two variables. We can conclude that mentally tough pupils-athletes are able to cope successfully with adverse situations in sport while using effective coping strategies (Jones et al., 2002; Jones et al., 2007). The pupils from our research sample

demonstrated the ability to cope with various types of demanding situations they face not just during training sessions but also during and after competitions. In the next section we will focus on separate components of mental toughness (confidence, control, and constancy) in relation to individual coping strategies

b) Relationship between coping strategies and the confidence component

In Slovak context no research has been focused on studying the relationship between the factors of mental toughness, as confidence, control and constancy and separate coping strategies. Thus, in the next step we aimed at identification of their mutual connections.

Jones et al. (2002) demonstrated that for mentally tough athlete is confidence (which is in the items of the questionnaire presented as a self-confidence) one of the crucial characteristics. Similar perspective based on the research study confirmed also Clough et al (2002). They identified self-confidence as a main component of mental toughness. In our research we identified strong, positive relationship between confidence (as a factor of mental toughness) and coping strategies in general. Subsequently we revealed significant relationship between confidence and two separate coping strategies: confidence and achievement motivation and then peaking under pressure. The first part of the finding can be supported by previous studies conducted by Jones et al. (2002) or Omar-Fauzee et al. (2009) who state that athletes should be flexible when it comes to difficulty situations. Confidence is highly needed since it reflects the attitude "I will not give up" and also the mindset which enables to think rationally (clear thinking) and to focus on dealing and coping with various demands related to specific sport context. Athletes who trust themselves and are free from self-doubts naturally perceive competitions as challenges which help them increase their achievement. Confidence might be associated with the belief that "I am better than my competitors". This can be developed in every single person from early childhood and we suppose that it is mainly affected by the attitudes of parents and significant ones. Bois et al. (2009) suggest that the way parents guide their children and express their trust in their sport skills and abilities, has a significant impact on their future self-confidence. Also Shen et al. (2018) confirm that parental support is one of the crucial factors related to enjoyment of physical activity. Children need to hear and also feel appreciation and encouragement from their parents. Such aspect of parental approach can lead children to identified beliefs that they can succeed in the sport activity they are engaged in. The second coping strategy that was positively related to confidence was peaking under pressure. This finding is in accordance with the study results conducted by Jones et al. (2002). We suppose that peaking under pressure is associated also with personality and the overall physical and mental state. Kimbrough, DeBolt and Balkin (2007) claim that mainly athletes, when facing stressful situations during competitions, can activate their organisms and they are able to invest more energy into their performance than what is perceived as a norm.

Other positive (but not as strong as the previous two) relationships were found between confidence and two coping strategies: coping with adversity and concentration. We can conclude that young athletes from our sample who are confident demonstrate higher ability to cope with adverse situations in sport when comparing them with those, who do not confide in themselves. Also Wolfson & Neave (2007) in their study revealed that people who are or work on building their self-confidence are more likely to stay positive in situations which might be experienced as tough or negative; moreover, they are free from worries regarding their possible failures. We can assume that athletes from our sample whose confidence is higher, have a greater ability to stay focused and be fully concentrated also under difficult conditions especially during plays or competitions. A weak but positive correlation was found between confidence and coping with adversity. We perceive this specific coping strategy as the ability to bounce back from

setbacks or failures and to overcome almost any hardship connected with sport performance. It is very similar to the concept of resilience which can be in a very simple way defined as the ability to adapt to demanding environment, uncertainty or life challenges. Positive but not significant relationship was identified between confidence and three coping strategies: coachability, goal setting and mental preparation, and freedom from worry. We can conclude that athletes in our sample do not fully accept instructions or advice from the coaches. They might perceive and take any criticism related to their performance as a sign of their own failure, thus having tendency to ignore it. The second strategy goal setting and mental preparation emphasizes the relevance of mental coaching which seems to be not sufficient in our sample. The third strategy freedom from worry means that athletes are not paralyzed by worries about their performance or about what other people might think if they do not perform well. It can be perceived as a mental freedom reflecting resilience of thoughts and ability to be fully engaged and confident. Based on our results we assume that all these three coping strategies are not in relation to confidence (as a component of mental toughness) in young athletes from our research sample.

c) Relationship between coping strategies and the control component

The ability to have control over behavior is one of the crucial characteristics for mentally tough athletes. They are constantly faced with various stressors, such as pressure for performance, lost matches or mental struggles. Especially under these circumstances losing control can lead to lower sport performance. The vast majority of published research (Golby & Sheard, 2003; Jones et al., 2007; Nicholls et al., 2008) aimed at the relationship between control (as a component of mental toughness) and coping strategies divided into two groups: emotion-oriented coping and task-oriented coping. They revealed enough support to validate the relationship between the ability to have control over oneself or situation and task-oriented coping. Mentally tough athletes are predisposed with internal locus of control and are able to have active roles in their victories. Roth and Cohen (1986) indicate that when the situation is perceived as less controllable, the athletes have a tendency to use avoidance coping strategy in order to reduce threats or avoid stressors. In our research sample no significant relationship was identified between control and separate coping strategies, despite the results of the research conducted by Tomalski (2013) who claims that when athletes are able to have control over situation, using coping strategies can result in successful outcomes. We can conclude that young athletes in our sample are not fully prepared to control their own thoughts or behavior that might in a long run negatively affect the ability to cope with stressors or difficult situations.

d) Relationship between coping strategies and constancy component

It was revealed in many studies (Lauer & Paiement, 2009; Rainey & Granito, 2010) that athletes who were predisposed with constancy (as a key factor in mental toughness) demonstrated the ability to keep a calm and concentrated mind, can effectively cope with difficult and demanding situations in sport context. We did not reveal any significant relationships between constancy and coping strategies though the results of many foreign studies confirmed this specific connection which might serve as a tool leading to successful high performance. We suppose that young athletes from our sample do not pay enough attention and time to mental preparation which seems to be a significant factor affecting their performance and success. Inability to concentrate and to meet all demands related to trainings or competitions negatively affects also the process of coping with adversity. Based on the aforementioned studies we expected positive relationships between constancy and all coping strategies. We can confirm just one positive relationship which was identified between constancy and coachability as a coping strategy. Other strategies showed just weak and not significant relationships with constancy. One of the basic finding in a study

of Jones et al. (2007) was that coaches who are having high expectations of athletes' performance and who use motivation in trainings, frequently report evident progress in athletes. Athletes, who are open, learn from the instructions of coaches and accept constructive criticism use their mental abilities, among which preparedness to focus and to not give up are crucial. The importance and relevance of coaching cannot be questioned since athletes who are sensitive to the feedback from their coaches maintain concentrated and thus can avoid being preoccupied with negative thoughts related to the result (Smith & Christensen, 1995). Based on our finding we can conclude that pupils from high school for athletes do not receive proper mental preparation which is considered as highly important in athletes' professional lives. According to Broďáni et al. (2019) the factor of age and sports level of students has an important impact on how students can cope with challenging situations not only in sport. When the athletes are able to stay calm and maintain this attitude when facing a tough situation, they naturally perceive their competitors and changing conditions as challenges. Constancy relates to athletes' determination to meet the demands, ability to take responsibility and set goals (Sheard et al., 2009). Psychological preparation of athletes in general should include reducing negative influences and promoting positive motivation to stay calm and maintain focus when dealing with difficult situations.

5 Conclusion

Not just by professionals or athletes but also by lay people sport is perceived as way to experience fun, enjoyment, to get to a relaxed state and also to meet new people. In a specific sport context for athletes the perceived pressure to peak under pressure and to deal successfully with adversity can cause stress. The crucial factor which affects high-performance and success is the ability to stay psychologically strong and maintain intense concentration and stay motivated in tough and discomfort situations. This ability is labelled as mental toughness and there is enough evidence that it is closely related to coping in general. The main objective of the study was to explore the relationship between coping strategies and mental toughness in young athletes, pupils of high school for athletes in Slovakia. The results show significant relationships between coping strategies and some factors of mental toughness. Mainly confidence as a single factor of toughness is positively correlated with several of coping strategies. Other factors of mental toughness are associated just partially with coping strategies; nevertheless we suppose that regular and professionally conducted mental preparation could help athletes overcome doubts and concerns thus they can push beyond all obstacles and succeed in sport.

Literature:

- Amiot, C. E., Gaudreau, P., Blanchard, C. M. (2004). Self-determination, coping, and goal attainment in sport. *Journal of Sport and Exercise Psychology*, 26(3), 396-411.
- Anshel, M. H. (2001). Qualitative Validation of a Model For Coping With Acute Stress in Sports. *Journal of Sport Behavior*, 24(3).
- Bahramizade, H., Besharat, M. A. (2010). The impact of styles of coping with stress on sport achievement. *Procedia-Social and Behavioral Sciences*, 5, 764-769.
- Broďáni J., Šiska, L., Kováčová, N. (2018). Interaction of physical activity, joy of physical activity and quality of life of high school students with different level of sport performance. In *International Journal of Physical Education, Sports and Health*, 5(4) pp. 12-18.
- Broďáni, J., Kováčová, N. (2019). The interaction of physical activity, joy of movement and quality of live of high school students and at different ages. *Physical Activity Review* 2019; 7: 134-142.
- Broďáni, J., Kováčová, N., Czaková, M. (2019). Gender Differences in Quality of Life and Physical Activity of High School Students. In *Acta Facultatis Educationis Physicae Universitatis Comenianae* 2019, 59(2): 96-110.
- Carver, C. S., Scheier, M. F., Weintraub, J. K. (1989). Assessing coping strategies: a theoretically based approach. *Journal of personality and social psychology*, 56(2), 267.
- Clough, P. J., Earle, K., Sewell, D. (2002). Mental Toughness: The Concept and Its Measurement. In I. Cockerill (Ed.), *Solutions in Sport Psychology* (pp. 32-46). London: Thomson Learning.
- Cowden, R. G. (2017). Mental toughness and success in sport: a review and prospect. *The Open Sports Sciences Journal*, 10(1).
- Golby, J., & Sheard, M. (2004). Mental toughness and hardness at different levels of rugby league. *Personality and individual differences*, 37(5), 933-942.
- Gould, D., Eklund, R.C., Jackson, S.A. (1993). Coping strategies used by U.S. Olympic wrestlers. *Research quarterly for exercise and sport*, 64 1, 83-93.
- Gucciardi, D. F., Gordon, S., Dimmock, J. A. (2008). Towards an understanding of mental toughness in Australian football. *Journal of Applied Sport Psychology*, 20(3), 261-281.
- Jones, G. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of applied sport psychology*, 14(3), 205-218.
- Jones, G., Hanton, S., Connaughton, D. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist*, 21(2), 243-264.
- Kimbrough, S., DeBolt, L.S., Balkin, R.S. (2007). Use of the Athletic Coping Skills Inventory for Prediction of Performance in Collegiate Baseball: *The Sport Journal, Wntr*, 10 (1).
- Kowalski, K. C., Crocker, P. R. (2001). Development and validation of the Coping Function Questionnaire for adolescents in port. *Journal of Sport and Exercise Psychology*, 23(2), 136-155.
- Krohne, H. W. (1993). Vigilance and cognitive avoidance as concepts in coping research. In H. W. Krohne (Ed.), *Attention and avoidance: Strategies in coping with aversiveness* (p. 19-50). Hogrefe & Huber Publishers.
- Lauer, L., Paiement, C.A. (2009). The Playing Tough and Clean Hockey Program. *Sport Psychologist*, 23(4), 543-561.
- Lazarus, R. S., Folkman, S. (1984). *Stress, appraisal, and coping*. Springer publishing company.
- Loehr, J. E. (1986). *Mental toughness training for sports: Achieving athletic excellence* (p. 216). S. Greene Press.
- Nicholls, A. R., Polman, R. C. (2007). Coping in sport: A systematic review. *Journal of sports sciences*, 25(1), 11-31.
- Nicholls, A. R., Polman, R. C., Levy, A. R., Backhouse, S. H. (2008). Mental toughness, optimism, pessimism, and coping among athletes. *Personality and individual differences*, 44(5), 1182-1192.
- Omar-Fauzee, M. S., Daud, W. R. B. W., Abdullah, R., Rashid, S. (2009). The effectiveness of imagery and coping strategies in sport performance. *European Journal of Social Sciences*, 9(1), 97-108.
- Rainey, D.W., Granito, J.V. (2010). *Normative rules for trash talk among college athletes: an exploratory study*. *Journal of Sport Behavior*, 33(3), 276-294.
- Roth, S., & Cohen, L. J. (1986). Approach, avoidance, and coping with stress. *American psychologist*, 41(7), 813.
- Sheard, M., Golby, J., Van Wersch, A. (2009). Progress toward construct validation of the Sports Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment*, 25(3), 186-193.
- Shen, B., Centeio, E., Garn, A., Martin, J., Kulik, N., Somers, C., & McCaughy, N. (2018). Parental social support, perceived competence and enjoyment in school physical activity. *Journal of sport and health science*, 7(3), 346-352.
- Smith, R. E., & Christensen, D. S. (1995). Psychological skills as predictors of performance and survival in professional baseball. *Journal of Sport and Exercise Psychology*, 17(4), 399-415.
- Smith, R. E., Schutz, R. W., Smoll, F. L., Ptacek, J. T. (1995). Development and validation of a multidimensional measure of sport-specific psychological skills: The Athletic Coping Skills Inventory-28. *Journal of Sport & Exercise Psychology*, 17(4), 379-398.
- Sollár, T., Sollárová, E. (2009). Proactive coping from the perspective of age, gender and education. *Studia Psychologica*, 51(2-3), 161-166.

31. Sollárová, E., Sollár, T. (2010). The psychologically integrated person and parameters of optimal functioning. *Studia Psychologica*, 52(4), 333-338.
32. Sollárová, E., Sollár, T. (2013) Person-Centered Approach: Theory and Practice in a Non-therapeutic Context, 2013. In. Jeffrey Cornelius-White, Renate Motschnig-Pitrik, Michael Lux (Eds.). *Interdisciplinary Applications of the Person-Centered Approach*. - New York : Springer, 2013. p. 177-192.
33. Solgajová, A., Sollár, T., Vörösová, G. (2015). Gender, age and proactive coping as predictors of coping in patients with limb amputation. *Kontakt*, 17(1), 67-72.
34. Solgajová, A., Sollár, T., Vörösová, G., Zrubcová, D. (2017). Personality as significant predictor of post-stroke anxiety. *Neuroendocrinology Letters*, 38(4), 290-294.
35. Thelwell, R., Weston, N., Greenlees, I. (2005). Defining and understanding mental toughness within soccer. *Journal of Applied Sport Psychology*, 17(4), 326-332.
36. Tomalski, J.L. (2013). *The relationship between coping and sport injury anxiety among college athletes*. A Thesis Submitted to the Faculty of The Graduate School at The University of North Carolina. 95 pp. https://libres.uncg.edu/ir/uncg/f/Tomalski_uncg_0154M_11245.pdf
37. Vaughan, R., Hanna, D., Breslin, G. (2018). Psychometric properties of the Mental Toughness Questionnaire 48 (MTQ48) in elite, amateur and nonathletes. *Sport, Exercise, and Performance Psychology*, 7(2), 128.
38. Wolfson, S., & Neave, N. (2007). Coping under pressure: Cognitive strategies for maintaining confidence among soccer referees. *Journal of Sport Behavior*, 30(2), 232-247.
39. Yoo, J. (2001). Coping profile of Korean competitive athletes. *International Journal of Sport Psychology*, 32(3), 290-303.

Primary Paper Section: A

Secondary Paper Section: AN

COMMUNICATION ASPECTS IN THE FRAMEWORK OF SMALL AND MEDIUM-SIZED ENTERPRISES AND PUBLIC ADMINISTRATION BODIES IN THE REGION

^aDENISA JÁNOŠOVÁ, ^bRENÁTA SÁDECKÁ, ^cLENKA LABUDOVÁ

University of Ss. Cyril and Methodius, Faculty of Mass Media Communication, Nám. J. Herdu 2, 917 01 Trnava, Slovak republic

e-mail: ^adenisa.janosova@ucm.sk, ^bre.sadecka@gmail.com, ^clabudova123@gmail.com

Acknowledgment: This paper is an output of the research project supported by the Grant Agency of the Ministry of Education of the Slovak Republic and the Slovak Academy of Sciences (VEGA) No. 1/0078/18 titled Aspects of Marketing Communication in the Management Processes of Circular Economy.

Abstract: Small and medium-sized enterprises can be considered carriers of innovation, employment, and social and regional integration. They guarantee higher efficiency and sustainable growth of the country's economy. Small and medium-sized enterprises are the most sensitive to changes in the business environment. In this paper, we focus on communication between small and medium-sized enterprises and public authorities in the selected Slovak town of Trnava. Based on the implementation of longer-term marketing research, several scientific methods and analyses were used, which took place in stages and individually followed each other; we tried to find relevant information about the issue. Our findings result from the implementation of correlation and regression analysis, determination of assumptions before the longer-term marketing research and questionnaire survey. Based on the findings, we present recommendations for improving the current state of communication between SMEs and public administration bodies and determining further possible scientific research on the issue.

Keywords: Communication, Public administration, Region, Small and medium-sized enterprises

1 Introduction

An essential aspect for achieving the long-term and stable progress of the regions is a positive business environment and the provision of appropriate support forms for the creation and development of small and medium-sized enterprises (SMEs), representing a unique source of new ideas, entrepreneurial ideas, economic growth and critical providers of jobs as stated by several authors (Agu, M., Isichei, E.E. and Olabosinde, T.M., 2018, Gunawan, T., Jacob, J. and Duysters, G., 2016, Bednárik, J. and Gubrická, I., 2013). Therefore, SMEs become a supporting pillar of the economy and a basis for the country's competitiveness. In Slovakia, SMEs' concentration is currently higher than in the rest of Europe (OECD, 2020). In Slovakia, SMEs represent 99.9% of the total business entities, provide employment opportunities in the corporate economy for almost ¾ (74%) of the active workforce and contribute more than half (55%) to value added. 97% of SMEs are micro-enterprises employing less than 10 employees. More than ¾ SMEs are active in business services, trade, construction, and industry (Ministry of Economic of the SR, 2019). SMEs recorded a positive development in 2019, but their results have already been affected by the slowdown in the Slovak economy's growth rate, reaching the lowest growth in the last three years. The year 2019 was also the last year of a successful decade for SMEs, which was characterized by increasing the SME sector's performance.

According to various authors (Al Sardia, SJ, & Ahmad, H., 2014, Cruz, C. and Nordqvist, M., 2012, Kallmuenzer, A. and Peters, M., 2018), SMEs are part of an open system that simultaneously establish various relationships with the economic, social and natural environment. Doem argues that the development of the company and subsequently the region itself is significantly influenced by the strengthening of innovation capacity and the transfer of scientific and technological knowledge from commercially successful products and services (Doem, R., 2009). The innovation process is a crucial element of any growth. The contribution of technological progress to economic growth in Western countries is estimated at 30-90%. The OECD lists 4 critical factors with a positive impact on regional economies (OECD, 2020). These are:

- growth of employment and income - investments in the establishment of new SMEs create jobs that have a multiplier effect on the entire community of the region,
- growth of tax revenues - tax revenues can flow into budgets at the central, regional or local level based on growth in the tax base from the growth of personal income, SME profits, consumption taxes, fees, etc.
- improving services and maintaining local revenues - the establishment of new SMEs can have a positive impact on local services and retail, which in turn helps to maintain revenues in the region and increase the attractiveness of the site,
- demonstration and motivational effect - the establishment of new SMEs in the region can, through model behavior, affect the population's motivation to establish their own SMEs.

According to the authors Gunawan and Celec, we can also define SMEs based on their interactions with their surroundings and the realization of relationships with other economic entities (Gunawan, T., Jacob, J. and Duysters, G., 2016, Celec, R., Globocnik, D and Kruse, P., 2014). Among the important ones are the links to the supply and sales market of SMEs. Thus, we cannot perceive SMEs only as unique isolated entities - they affect their regional environment and, vice versa, SMEs influence the development and level of regions.

A fundamental prerequisite for the prosperity of the sector of enterprises belonging to SMEs according to size categorization is access to financial resources and communication of financial support opportunities for SMEs from the status of public administration and related bodies (Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P., 2016). Based on their characteristics, SMEs have characteristic requirements and needs in the financial field. SMEs are not sufficiently informed about funding alternatives for carrying out their business activities (Eniola, A.A. and Entebang, H., 2015). Based on this finding, there should be a consensus between the public administration and the SME in providing all the information relevant and necessary for entrepreneurs' proper and favorable functioning.

2 Literature review

Public administration is a mechanism with many interrelationships in which a political, organizational, legal and other nature takes place. Public administration summarizes such activities through which the competent authorities, according to their legal competencies, put and apply state laws into natural and legal persons (Kakouris, A., and P. Ketikidis., 2012). The public administration reflects the governance of the state from an institutional point of view. In addition to the wide range of bodies and institutions, citizens may also participate in public affairs administration, thus confirming the sovereignty of the citizen in the state. Agwu includes the following situation in his findings when the management of public affairs is directly and indirectly involved by the entrepreneurs themselves in the territory (Agwu, M. O., & Emeti, C. I., 2014).

Since the beginning of November 2016, all public authorities, including local government entities, have been obliged to exercise public power electronically in Slovakia (eGovernment., 2017). Entrepreneurs in Slovakia are entitled to provide public administration services electronically, without the need for personal visits to offices and loss of time or other related costs. In 2019, an inspection was carried out by the National Audit Office, focused on using the eGov system, i.e., electronic provision of public administration services to customers in municipalities and cities in Slovakia. The audit found that SMEs prefer personal communication with public authorities. Also, the inspection found that 47% of municipalities compared the level of 2017 and 2018 consider the level of eGov system to be improved, 45% as unchanged and 4% of municipalities consider

the system to be improved while welcoming further innovations of electronic services in the system (eGovernment), 2017).

In general, effective communication leads to creating and maintaining fair and mutually beneficial relationships, all the more so if it is a town or village (Albert, M. N., & Couture, M. M., 2013). In the age of information technology, the municipality can not avoid the focused development of communication towards its customers. For entrepreneurs, communication with the municipality represents an increasingly current need, a prerequisite and a starting point for cooperation (Kocak, A., Carsrud, A. and Oflazoglu, S., 2017). The marketing process is based on communication, especially on communication with the customer - from identifying needs and desires in marketing research to the product sales phase and communication made after the purchase. It should not be different in the municipality's marketing (Gupta, VK and Batra, S., 2016). The municipal authority is responsible for the development of the managed area and, therefore, should communicate with entrepreneurs on and outside its territory to ensure the municipality's prosperity (Nielsen, S.B. and Momeni, M., 2016).

The partnership between SMEs and the municipality is at the same time an instrument of economic and social policy and an understanding of the need to connect people, organizations to meet goals of interest to entrepreneurs, the municipality but also the general public (Monteiro, AP, Soares, AM and Rua, OL, 2019, Celec, R., Globocnik, D. and Kruse, P., 2014).

Eniola presents the positive effects of cooperation between the municipality and entrepreneurs (Eniola, A.A. and Entebang, H., 2015) and divides them as follows:

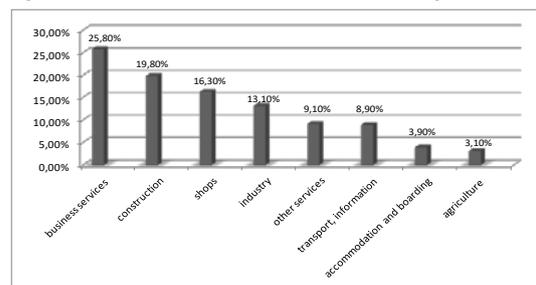
- involvement of several partners in the development of municipalities and regions and reaching consensus and support for development programs,
- more comprehensive use of professional capacities in the territory in the creation and implementation of program documents,
- identification of real development resources (financial, material, personnel) for the implementation and management of projects,
- a higher degree of legitimacy and transparency in the decision-making of public administration bodies,
- the possibility of strengthening innovation processes and acquiring skills outside the organizational framework of individual institutions,
- more significant opportunities to obtain external and internal financial resources for development projects

A good example from practice, reflecting the effective communication between the municipality and the SME, is, for example, the year-round Fair under the town hall in Levoča Jarmok pod radnicou) (Dnes24., 2019). It is a project connecting local producers from Slovakia in order to present their handmade products. The year-round fair brings creativity, initiative, culture and sustainability to the village. Such a project ultimately supports local and regional economic and social development and improves the SME image and the town itself.

3 Material and research methods

At the end of 2019, 58,500 business entities belonging to the size category of small and medium-sized enterprises (MofE of SR, 2019) were registered in the Trnava self-governing region territory. Approximately 1 in 10 active small and medium-sized enterprises in Slovakia (9.8%) had their registered office in the Trnava self-governing region in 2019. Considering the long-term aspect, the number of active SMEs in the Trnava region is increasing. Over the last 15 years, the number of SMEs in the Trnava Region has increased by 28.9%.

Figure 1 Sectoral structure of SMEs in Trnava Region in 2019



Source: own processing based on data of MofE SR, 2019.

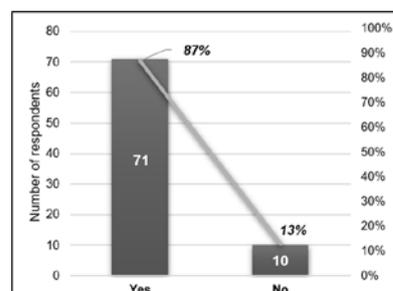
In the sectoral structure of SMEs in the Trnava self-governing region, the services sector is the most represented with a share of 47.7%. A more detailed sectoral breakdown shows that a quarter of 25.8% of SMEs performed their main activity in the business services sector. Another fifth (19.8%) of SMEs operate in the construction sector. Among SMEs in the Trnava region are the least represented sectors agriculture, accommodation and food industry. In the long-term perspective, the share of SMEs performing their primary business activity in trade is declining and, on the contrary, the importance of services, especially business services, is growing (MofE SR, 2019).

In 2019, we carried out long-term marketing research focused on issues within SMEs' operations in Trnava. One of the researched areas of the issue was communication between SMEs and public administration. This part contained 6 questions answered by 81 SME respondents from the field of trade. Long-term marketing research consisted of several stages, individually mutually linked using several scientific methods and research analyzes. Before the actual implementation of marketing research, we set the assumptions. The assumptions were determined based on a pilot survey and hard data available from the Statistical Office of the Slovak Republic. In the empirical part of this paper, we present and analyze the questionnaire survey findings, verify the assumptions and perform regression and correlation analysis between the researched variables. Based on the findings of long-term marketing research, we present recommendations that could be used by public authorities to improve communication with SMEs.

4 Results

In the following part of the paper, we present graphically illustrated answers to selected questions to present the researched issues. The practical part also contains surveys focused on small/medium-sized enterprises and verification of established assumptions.

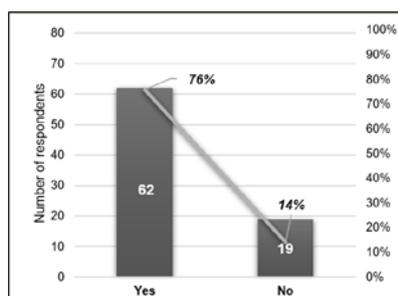
Graph 1 Did you find out from the relevant public authorities in your workplace all the necessary information regarding possible financial support for self-employed persons?



Source: Own processing

Of the 81 respondents asked, up to 87% stated that they got the required information due to inquiries from the competent authorities. The remaining 10 respondents, representing 13%, stated that they did not get the necessary information.

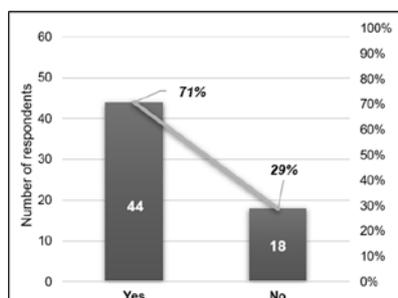
Graph 2 Did you look for information on the self-employed person on the town/region's available website?



Source: Own processing

On the graph, we can see the respondents' answers to the question of whether entrepreneurs were looking for information on financial support for self-employed persons. Respondents who answered yes represented the highest percentage (62%), 19 respondents chose the negative option, representing 14%.

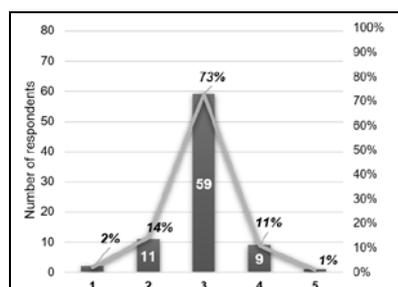
Graph 3 Did you find the available website of the town/ region all the necessary information and documents to provide financial support for self-employed persons?



Source: Own processing

The previous question had a sub-question of whether those respondents who searched for the required information on the competent authority's available website also found this information. The majority of respondents answered yes; in particular, 44 (71%), 18 respondents indicated option No.

Graph 4 On a scale from 1 to X, evaluate the satisfaction with the communication with the body/authorities.



Source: Own source

The respondents' question on a scale of 1-5 satisfaction with communication with authorities operating in the same territory achieved the largest representation number of 3, up to 73%. Entrepreneurs, therefore, evaluate communication as average.

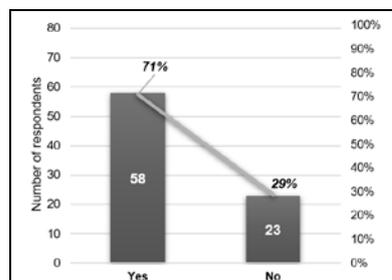
Question 5- Is there anything you would advise the relevant authorities to improve communication with entrepreneurs?

Within the results of the fourth question, we present the 3 most common areas of answers:

- publish current information on the website and relevant portals without any delay;
- be available in case of personal or telephone contact;

- simplification of bureaucratic tasks and clearly defined instructions for the necessary documentation.

Graph 5 Do you see any improvement in communication, providing information at the level of offices-entrepreneurs?



Source: Own processing

We perceive positively the answer to whether entrepreneurs perceive an improvement in communication and information provision. 58 respondents indicated Yes and the remaining 23 respondents indicated No.

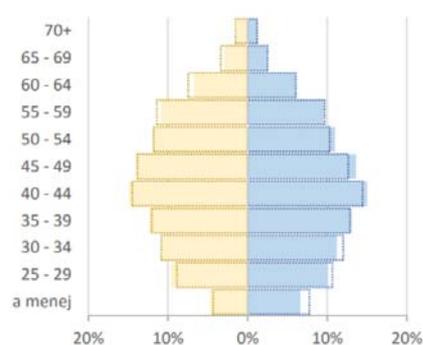
Assumption verification

As part of our survey, we set the following assumptions, the results of the survey results helped us verify or reject the assumptions.

P1 - We assume that our survey's largest age share will be respondents aged 40 - 49 years.

The assumption is set up based on data from the Statistical Office of the Slovak Republic for 2019. Natural persons - entrepreneurs in the Trnava self-governing region had the largest representation from 40 to 49 years during the research period; the results are shown in the graph:

Graph 6 Age distribution of SME entrepreneurs in the TT region in 2019



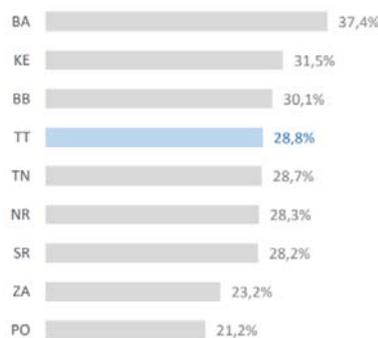
Source: SBA AGENCY (2019). Small Medium Business. [online]. [cit. 2021-02-10]. Available at: <http://www.sba.agency.sk/sites/default/files/msp-2019-trnavsky-samospravny-kraj.pdf>

The assumption was verified; the age group of 40-49 years had the largest age share among our respondents, 56%, which represents 45 respondents.

P2 - We assume that more than 25% of our respondents are women.

The assumption is based on data from the Statistical Office of the Slovak Republic for 2019. Within the Trnava Region, women entrepreneurs accounted for almost 30% - 28.8%. The results are shown in the graph:

Graph 7 Percentage of women in SME in 2019 in the Trnava region



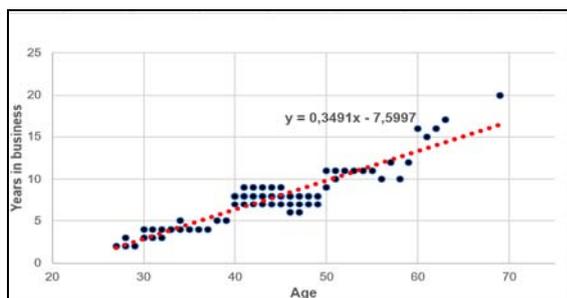
Source: SBA AGENCY (2019). Small Medium Business. [online]. [cit. 2021-02-10]. Available at: <http://www.sbagenc y.sk/sites/default/files/msp-2019-trnavsky-samospravny-kraj.pdf>

The assumption was not verified; within our sample, women were 19%, i.e., 16 respondents.

P3 - We assume that the higher the respondent's age, the longer he has been in business. There is a relationship between the respondent's age and the number of years spent/working in the business sphere.

As part of the verification of the set assumption, we performed a correlation, resulting in the following graph:

Graph 8 The relationship between the age of the entrepreneur and the years in business



Source: Own processing

Based on the formula, we can determine the values of a, b. The value of a = 0.3491 and the value of b = 7.5997. If, for example, an entrepreneur in Trnava is 51 years old, the expected number of years in the business sphere/in business is on average 10 years ($y = 0.3491 \times 51 - 7.5997$).

The relationship between the variables - age and number of years of business, we found using a correlation. The correlation coefficient turned out to be positive 0.91788 (the closer the result is to +1, the closer the relationship between the 2 variables is). The result reflects the relatively close relationship between the entrepreneur's age and the years spent in the business sphere, which supports the assumption - the higher the age of the entrepreneur, the more years spent in the business environment.

Table 1 Correlation relationship between the researched variables

	Age	Years in business
Age	1	
Years in business	0,917881928	1

Source: Own processing

The results were subsequently verified in a regression analysis, confirmed the accuracy of the data.

Table 2 Regression of researched variables

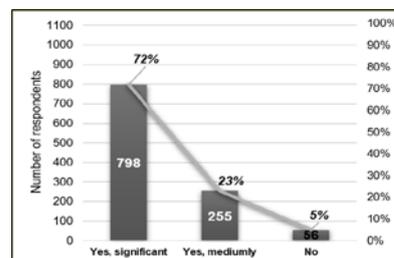
Regression Statistics	
Multiple R	0,917881928
R Square	0,842507233
Adjusted R Square	0,840513654
Standard Error	1,340972987
Observations	81
ANOVA	
	<i>df</i>
Regression	1
Residual	79
Total	80
Coefficients	
Intercept	-7,599651554
X Variable 1	0,349095229

Source: Own processing

Complementary survey results for the complex needs of the researched issues in the paper

As part of the analytical part, we also present the results of selected questions from a survey conducted by the Slovak Business Agency; our goal is to approach the impact of the pandemic situation on small and medium-sized enterprises' functioning. The survey was carried out by the Slovak Business Agency, the Association of Slovak Entrepreneurs and the Slovak Trade Association. The survey aimed to find out the opinions of sole proprietors, small and medium-sized enterprises in selected sectors (accommodation services, catering services, arts, entertainment, recreation, sports, education, retail) on current measures in connection with the second wave of the corona crisis and to obtain information on preferred support measures. Data was collected between October 13-20, 2020.

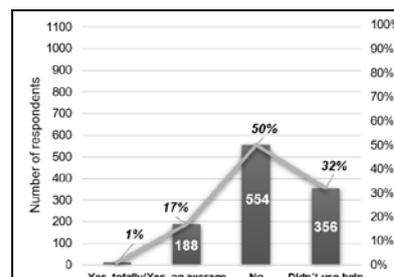
Graph 9 Will the current anti-pandemic measures (as of 15 October 2020) harm your business?



Source: Own processing based on ZPS (2020). Survey results: Entrepreneurs' views on the effects of the second wave of the corona crisis. [online]. [cit. 2021-02-10]. Available at: <https://www.zps.sk/novinky/2020/vysledky-prieskumu-nazory-podnikatelov-druha-vlna>

72% of respondents expect a significant negative impact on business and a slightly negative another 23% of the asked entrepreneurs. This resulted from a survey on the impact of measures on the most affected sectors, attended by 1 109 respondents from the environment of small and medium-sized enterprises and sole proprietors.

Graph 10 Has the current state aid been able to compensate you for the loss of sales since the beginning of the pandemic?



Source: Own processing based on ZPS (2020). Survey results: Entrepreneurs' views on the effects of the second wave of the corona crisis. [online]. [cit. 2021-02-10]. Available at: <https://www.zps.sk/novinky/2020/vysledky-prieskumu-nazory-podnikatelov-druha-vlna>

The decline in sales was significantly higher than the state's aid for almost half of the companies contacted (49%). The worst situation is among entrepreneurs in the gastronomy sector, where more than half (65%) of entrepreneurs recorded a significantly higher decline in sales than state aid. The aid to date has been able to entirely or at least partially compensate for the loss of revenue caused by the outbreak of a pandemic in one-fifth of entrepreneurs (19%). For various reasons, almost a third (32%) of the addressed companies have not yet used state aid.

In response to the second wave of the pandemic, most entrepreneurs in their companies are forced to implement a wide range of measures to reduce losses. Addressed entrepreneurs are beginning to adapt the provision of services to new market needs or invest their own reserves from the past to keep the company running (almost 42%). Almost a quarter (23%) of the addressed entrepreneurs responded to the pandemic's second wave by reducing the number of jobs for their employees or planning to do so soon. A more radical measure such as redundancies is being prepared by a similar group of entrepreneurs (23%), most often in the field of gastronomy (44%).

5 Summary and conclusion

Surveys and research focused on efficiency and communication at the local government level are a very current topic, primarily in communication between the business sector operating in the territory and the authorities administering the region. The success of implementing marketing communication to the town management determines whether the town will be successful in attracting and keeping any entrepreneurs in its territory.

With its decisions, activities and competencies, the local government significantly influences the business environment's quality in a particular region. As the vast majority of small and medium-sized enterprises are currently closed due to a pandemic situation or are suspended or operating under other conditions set by regulations, it is more than appropriate for the municipality, being currently the closest to them, to know and be aware of the issues of entrepreneurs operating in their territory, and try to create conditions for sharing optimal and regular information with entrepreneurs as much as possible. This activity includes finding ways of communication that suit both sides of the communication channel, both the sender and the recipient of the message/announcement. Of course, considering the current pandemic situation, finding compromises but not reducing the quality and timeliness of information is more than crucial.

At the end of the paper, we also present a survey carried out by the Association of Towns and Municipalities of Slovakia, which found out which municipal authorities preferred communication with citizens during the emergency. During the emergency, 77.9% of local governments did not prefer the personal way of communication between citizens and employees of municipal and municipal authorities. As many as 98.3% preferred communication via e-mail and 97.7% would prefer telephone over personal and e-mail communication. The answer options also included communication via teleconferencing tools such as Skype, MS Teams and others. 8.9% of respondents preferred this method of communication at the time. Respondents were able to choose several alternative options when answering concerning which method of communication with the government they preferred in the given period.

Further attention to this topic has great potential in the possibilities of research. We perceive the comparison of individual towns within the Trnava region as very interesting for the processing. A comparison of this type could reveal how big the difference is between the use of marketing communication tools at the local government level and how it affects small and

medium-sized enterprises in a given area. With the help of such analyses, it would be possible to find out to what extent these lacks are related to the place's size, the number of inhabitants or its location.

Literature:

1. Agu, M., Isichei, E.E. and Olabosinde, T.M. (2018). *Infrastructural development and growth of micro, small and medium scale enterprises (MSME)*. Academic Journal of Economic Studies, 4 (4), 71-77.
2. Agwu, M. O., & Emeti, C. I. (2014). *Issues, challenges, and prospects of small and medium scale enterprises (SMEs) in Port-Harcourt City, Nigeria*. European Journal of Sustainable Development, 3(1), 101.
3. Al Sardia, S. J., & Ahmad, H. (2014). *The moderating effect of role stressor on the influence of evolutionary process change factors on internal customer satisfaction in telecommunication in Jordan*. Asian Social Science, 10(4), 114.
4. Albert, M. N., & Couture, M. M. (2013). *The support to an entrepreneur: From autonomy to dependence*. Sage Open, 3(2), 13.
5. Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2016). *Financing of working capital requirement, financial flexibility, and SME performance*. Journal of Business Economics and Management, 17(6), 1189-1204.
6. Bednárík, J. and Gubrická, I. (2013). *Personálny manažment v kontexte trvalo udržateľného rozvoja*. Łódź : Księży Młyn Dom Wydawniczy Michał Koliński. 192 p.
7. Celec, R., Globocnik, D. and Kruse, P. (2014). *Resources, capabilities, export performance and the moderating role of entrepreneurial orientation in the context of SMEs*. European Journal of International Management, 8 (4), 440-464.
8. Cruz, C. and Nordqvist, M. (2012). *Entrepreneurial orientation in family firms: a generational perspective*. Small Business Economics, 38 (1), 33-49.
9. Doem, R. (2009). *Investigating Barriers to SME Growth and Development in Transition Environments: A Critique and Suggestions for Developing the Methodology*. International Small Business Journal, 27 (3), 275-305.
10. Dnes24. (2019). *Celoročný jarmok pod radnicou v Levoči vyzdvihlo aj Združenie miest a obcí Slovenska*. [online]. [cit.2021- 02-10]. Available at: <https://spisska.dnes24.sk/celoročný-jarmok-pod-radnicou-v-levoci-vyzdvihlo-aj-zdruzenie-miest-a-obci-slovenska-346737>.
11. eGovernment. (2017). *eGov*. [online]. [cit.2021- 02-10]. Available at: <https://portal.egov.sk/sk/content/egovernment>.
12. Eniola, A.A. and Entebang, H. (2015). *Government policy and performance of small and medium business management*. International Journal of Academic Research in Business and Social Sciences, 5 (2), 237-248.
13. Gunawan, T., Jacob, J. and Duysters, G. (2016). *Network ties and entrepreneurial orientation: innovative performance of SMEs in a developing country*. The International Entrepreneurship and Management Journal, 12 (2), 575-599.
14. Gupta, V.K. and Batra, S. (2016). *Entrepreneurial orientation and firm performance in Indian SMEs: universal and contingency perspectives*. International Small Business Journal, 34 (5), 660-682.
15. Kallmuenzer, A. and Peters, M. (2018). *Entrepreneurial behaviour, firm size and financial performance: the case of rural tourism family firms*. Tourism Recreation Research, 43 (1), 2-14.
16. Kakouris, A., and P. Ketikidis. (2012). *Editorial: poles of Innovative Entrepreneurship: A Triple Nexus*. International Journal of Innovation and Regional Development, 4 (3/4), 197-203.
17. Kocak, A., Carsrud, A. and Oflazoglu, S. (2017). *Market, entrepreneurial, and technology orientations: impact on innovation and firm performance*. Management Decision, 55 (2), 248-270.
18. MHSR. (2019). *Analýza stavu malého a stredného podnikania*. [online]. [cit.2021- 02-10]. Available at: <https://www.mhsr.sk/uploads/files/eU2FzFaz.pdf>.
19. Monteiro, A.P., Soares, A.M. and Rua, O.L. (2019). *Linking intangible resources and entrepreneurial orientation to export*

performance: the mediating effect of dynamic capabilities.

Journal of Innovation and Knowledge, 4 (3), 179-187.

20. Nielsen, S.B. and Momeni, M. (2016). *Impact of personnel capabilities on organizational innovation capability.* Journal of Management and Innovation, 2 (2), 1-24.

21. OECD (2020). *Economic Forecast Summary.* [online]. [cit.2021-02-10]. Available at: <http://www.oecd.org/economy/slovak-republic-economic-snapshot/>.

22. SBA AGENCY (2019). Small Medium Business. [online]. [cit. 2021-02-10]. Available at: <http://www.sbagency.sk/sites/default/files/msp-2019-trnavsky-samospravny-kraj.pdf>

23. ZMOS (2020). During the pandemic, local governments preferred e-mail and telephone communication. [online]. [cit. 2021-02-10]. Available at: <https://www.zmos.sk/samospravy-pocas-pandemie-preferovali-mailovu-a-telefonicku-komunikaciu--oznam/mid/405616/html>

24. ZPS (2020). Survey results: Entrepreneurs' views on the effects of the second wave of the corona crisis. [online]. [cit. 2021-02-10]. Available at: <https://www.zps.sk/novinky/2020/vysledky-prieskumu-nazory-podnikatelov-druha-vlna>

Primary Paper Section: A

Secondary Paper Section: AO

THE EFFECT OF THE FIRST WAVE OF THE COVID-19 GLOBAL PANDEMIC ON SUMMER HOLIDAY PLANS IN 2020 – CASE STUDY FROM THE CZECH REPUBLIC

^aNIKOLA SAGAPOVA, ^bRADIM DUŠEK

*Institute of Technology and Business in České Budějovice,
Okružní 517/10, České Budějovice, 370 01, Czech Republic
email: ^a26594@mail.vstecb.cz, ^bdusek@mail.vstecb.cz*

Abstract: This study aims to determine the changes in summer holiday plans of the Czechs in 2020 as well as their preferences concerning summer holiday destinations and accommodation as a reaction to the first set of tough restrictions adopted by the Czech government during the first wave of the COVID-19 pandemic in the spring of 2020. The survey included a random sample of 637 respondents. The findings show the shift towards domestic tourism and might be helpful for destination management, accommodation facilities owners, as well as for researchers examining the impact of the coronavirus crisis on consumer decisions in the hospitality and tourism industry.

Keywords: COVID-19 pandemic; Hospitality and Tourism Industry; Destination; Accommodation Facilities; Marketing Mix; the Czech Republic.

1 Introduction

Tourism is a social, economic, and cultural phenomenon (Harrison, 2007) which has a considerable economic impact in a given geographic area affecting income, wealth, and employment of residents of such areas (Frechtling, 1994). A geographical unit visited by tourists forms a tourism destination (Burkart and Medlik, 1974). Moreover, tourism destinations can be perceived as a special kind of network where cooperation processes are essential for success as well as for gaining sustainable competitive advantage in the tourism market (Žemla, 2016), and the application of effective destination management is the key to sustain competitive advantage (Ritchie and Crouch, 2003). Tourism might play a crucial role in the development and growth of a particular destination, but also of a country, especially in the case of the developing ones (Faladeobalade and Dubey, 2014). In some destinations, tourism represents the only means of economic growth (Pratt, 2015). In tourism destinations, economic growth is triggered by tourists' and visitors' expenses, and investments in tourism infrastructure (Navrátil et al., 2013).

With no doubt, tourism represents one of the catalysts of today's global economy. Travelling is a modern commodity with a growing demand that is constantly met by extended supply. During its development, travelling has turned from luxury goods into common goods. This change is connected not only with the transformation of the society, or the economic growth solely, but also with the technological progress which has enabled this change (Šauer and Repík, 2015). Tourism is one of the fastest growing industries in the modern world (Tuhin and Majumder, 2011), representing a strong economic sector of many countries with a significant share on national GDP due to its contribution to the balance of payment, production, employment, and strong links between tourism and other economic sectors (Proença and Soukiazis, 2008). Travelling and tourism is a human right incorporated in many key international documents (Higgins-Desbiolles and Russell-Mundine, 2008).

However, there are also negative consequences of tourism development, as tourism affects the rights of local people, with a possible conflict of rights, and contributes to global climate change, resulting in voices calling for a slowdown in tourism growth, or even its degrowth (Gascón, 2019). An unintended slowdown of tourism was caused by recent COVID-19 global pandemic. The first three cases in the Czech Republic were confirmed on 1 March, 2020. All of these infected people had returned from winter holidays in Italy (ČT24, 2020), and since 2nd March, first measures and restrictions concerning the free movement of people started to be introduced to reduce the risks of infected person crossing the borders and thus spreading the disease. These government restrictions were gradually strengthened, and resulted in cancelled and suspended flights, random border checks, quarantine for arrivals from high-risk areas, hospitality venues, restaurants, and similar facilities'

closures, border closures and the obligation to wear protective masks. At the end of May 2020, the borders were opened and the majority of restrictions concerning the tourism and hospitality industry were loosened: indoor spaces including cafes, restaurants as well as zoos, castles, and chateaux were opened for visitors.

The aim of the paper is (a) to determine the changes in the plans of the Czechs for the 2020 summer holiday in reaction to the first set of government tough restrictions introduced and applied during the first months (March-May 2020) of the COVID-19 pandemic in the Czech Republic, and (b) to identified specific preferences concerning the destinations and accommodation for summer holiday in 2020 of Czechs, who decide to spend their holiday in the Czech Republic because of the pandemic.

1.1 Tourism and crises

Tourism is not just an economic growth factor; it plays a significant role as a factor of convergence among countries as well. Tourism improves the standard of living, and generate welfare effects on both sides (the sending and the receiving countries) (Proença and Soukiazis, 2008). However, its development can be seriously affected by various events including economic crises, conflicts and wars, terrorist attacks, political instability, natural disasters, disease outbreaks, international boycotts, isolation, or massive changes in consumer behaviour (Smeral, 2009; Ioannides and Apostolopoulos, 1999; Wiedenhoft Murphy, 2010). Consumer cutbacks excessively have negative impact on the demand for luxury goods as well as tourism services, which can be labelled as non-essential goods (Smeral, 2009).

During and after the global economic recession and crisis in the year 2009, although being hit, the impact of the crisis on international tourism was smaller than on foreign trade and industrial production. Anyway, tourism recovery process can be slower in tourism than in case of trade or production. Another problem is consumer budget, which would be spent primarily on necessary goods rather than on luxury or non-essential goods. The loss of wealth would depress consumer demand. However, domestic tourism was hit much less than international travel resulting in people travelling in own country instead of staying at home and saving (Smeral, 2010). Consumer behaviour of European tourists differs when it comes to saving. GDP and GDP growth play a key role when deciding on tourism expenditure cutback. Households which are trying to cut back on their expenses as well as households located in small towns and rural areas are more likely to spend their holidays closer to their home. Households located in regions with unfavorable climate are less likely to cut back on their tourism expenditures (Eugenio-Martin and Campos-Soria, 2014).

Due to global economic recession, there might be expected a boom in domestic tourism. The phenomenon of enjoying holidays and travel closer to home is called "staycation" (Papatheodorou et al., 2010). Another aspect important for tourism development, which usually shifts to more positive attitudes during economic crises, is the residents' perception of tourism. Local residents are a valuable asset of a tourist destination. Their perceptions of tourism are crucial for designing tourism development strategies considering sustainable development, as sustainable tourism may be implemented only through the involvement of those affected by tourism (Hateftabar and Chapuis, 2020; Sheldon and Abenoja, 2001). Residents are stakeholders in a given destination, and they co-create the tourism product, as well as affect the visitors' perception of the destination. Their involvement in the decision-making process and governance increases their satisfaction and positive perception of tourism development (Gajdošík, Gajdošíková and Stražanová, 2018). On the other hand, residents' negative perceptions of tourism impacts could serve as an indicator of a tourism destination decline, because the decline

might be not only the result of negative economic or environmental development, but also social changes (Diedrich and García-Buades, 2009). However, during economic crisis, the positive perception of tourism and its impact, as well as the willingness to support its development by residents increases even in the mass tourism destinations (Hateftabar and Chapuis, 2020; Garau-Vadell et al., 2018).

1.2 COVID-19 and tourism

The COVID-19 global pandemic has been recognized as one of the most impactful events of the 21st century (Zenker and Kock, 2020). It has caused significant changes in people's lives and economic activities, as a part of economy has been shut down in order to protect people against the virus (Bashir, Ma and Shahzad, 2020). The impact of the pandemic on tourism is tremendous, as borders have been closed, air fleets and cruise vessels have stayed grounded and docked, accommodation establishments and out-of-home dining have been shut down (Zenker and Kock, 2020). The right to travel and enjoy hospitality and tourism services has been restricted in a way which has been unprecedented since the two world wars (Baum and Hai, 2020). This situation has led to significant revenue loss for tourism industry due to the restrictions of movement (Williams, 2020), amplified by high risk and uncertainty influencing travel intentions (Golets et al., 2020).

The coronavirus pandemic alters image of destinations, and may harm especially those with high covid infection rates, while in contrast, it can be beneficial for some other destinations (Zenker and Kock, 2020). The COVID-19 has significantly affected international travel, tourism demand, and the whole hospitality industry (Chang, McAleer and Ramos, 2020). In the summer season of 2020, the desire to travel by air dropped by about 30 % in Europe and the Americas, by 50 % in Asia, while the intention to travel dropped by additional 10 - 20 % (Gallego and Font, 2020). The countries more dependent on tourism, as well as countries more dependent on international trade, will be more affected by the impacts of this event, and a decline in GDP can be expected (Fernandes, 2020). The restart of the international travel is expected to be dependent on the vaccination, and medical certificates which might be required for entering a country (Hall, Scott and Gössling, 2020), or boarding an international flight.

Yet, this global pandemic brings about a new hope as it creates an opportunity and impulse to reshape tourism into a more sustainable, inclusive and caring form (Cheer, 2020). Especially the transition to more sustainable tourism would be a win-win situation both for the travelers and host communities. The mobility restrictions adopted have already forced many people to embrace hyperlocal approaches to travel into nearby nature, local spots, forgotten and overlooked corners of the country, rural and peripheral areas of own region. Such behaviour can be referred to as low-carbon and human-scaled travelling providing many kinds of social, economic, and environmental benefits (Mackenzie and Goodnow, 2020; Korstanje, 2020; Ianioglo and Rissanen, 2020). Fennel (2020) argues that there are several disruptive influences important for a shift of tourism towards more sustainable practices in the new age of travel and tourism. These key factors include health and safety concerns, such as in the case of COVID-19 global pandemic, as well as environmental crisis, or periodic chaos in markets and economies, and new technologies. COVID-19 has the role of a challenger or even game-changer for tourism industry and it seems that rapid recovery after this crisis could oppose the efforts to transform tourism sector into more ethical, responsible and sustainable, making this struggle critical for the future development of tourism (Higgins-Desbiolles, 2020a).

2 Materials and Methods

An extensive survey was carried out in order to determine the preferences and intentions of inhabitants of the Czech Republic concerning travelling in the summer of 2020 during the first wave of COVID-19 pandemic and related government restrictions that started in the middle of March 2020 and ended

on 26 May. The survey was conducted in April 2020 (in a period of general uncertainty if the borders and accommodation facilities will be opened before summer) on a random sample of 637 respondents a total of 637 respondents aged 18 years and older. The classification of respondents is described in Tab. 1 below. The questionnaire survey consisted of 24 mostly closed-ended questions dealing with different aspects of travel desires, intentions, preferences, and attitudes for the summer of 2020, which was expected to be very unusual. Excel and Statistica, version 13 were used to evaluate the data, and QGIS software was used to create a map of preferred regions based on the collected data. Pearson chi-square statistical test was applied to compare different groups of respondents based on their gender, age, education, status and income with the significance level of 0.01.

Tab. 1: Socio-demographic charact. of the sample (n=637)

Gender	Male (n=306)		Female (n=331)	
Age	19-26 (n=191)	27-40 (n=204)	41-55 (n=193)	56-65 (n=49)
Education	Primary (n=19)		Secondary (n=376)	Tertiary (n=242)

Source: Authors

Chapters 4.2 and 4.3 are focused only on the analysis of the data from the respondents who decided to spend their paid summer holiday in 2020 at least partly in the Czech accommodation facilities, mainly as a result of the implemented restrictions on the movement, with a risk that the restrictions such as closed borders will be still valid in the summer (339 respondents out of 637). The data from the respondents who intended (a) to stay in the Czech Republic, but planned to spend their holiday without the need to book and pay for accommodation (domestic one-day trips, own cottage, etc.) or (b) to spend the whole holiday abroad, although this possibility was uncertain at the time of data collection, was not included in the analysis in the aforementioned chapters. So although having random sample of respondents, the selective sample of 339 respondents was used. This selective sample was not representative as shown in Tab.2, which shows socio-demographic characteristics of the sample.

Tab. 2: Socio-demographic characteristics of the selective sample (n=339)

Gender	Male (n=83)		Female (n=256)		
Age	19-26 (n=191)	27-40 (n=84)	41-55 (n=54)		56-65 (n=10)
Education	Secondary (n=227)		Tertiary (n=112)		
Status	Student (n=137)	Employed (n=172)	Self-employed (n=14)	Maternity leave (n=14)	Ret. (n=2)
Income*	Below average (n=46)		Average (n=232)	Above average (n=56)	Undefined (n=5)

Source: Authors (*income stands for household income)

3 Results

3.1 Changes in summer holiday intentions

The obtained data show a significant shift in the preferences and travel intentions for the summer season of 2020, which have been negatively affected by the COVID-19 global pandemic and the related tough Czech government restrictions on free movement adopted in the period of mid-March - the end of May 2020 (closed borders, closed non-food shops, and all services including accommodation facilities, restaurants, bars, and pubs). The results show a noticeable decline in the Czechs' wishes to spend summer holiday abroad. That means an increase in plans for domestic holiday, as well as an increase in the preferences for just one-day trips, staying at own cottages or staying home. Nearly 67 % of respondents had originally planned to enjoy their summer at least partially abroad. Most of them had intended to combine domestic and abroad summer travelling, but more than 21 % had desired to enjoy their whole summer holiday abroad before the pandemic hit the world (see Figure 1). The respondents, who still planned to spend the summer abroad

3.3 Marketing mix update suggestions for accommodation facilities

Considering the marketing mix (4P - product, price, place, and promotion) part of the survey, the results can be seen as relevant recommendations for accommodation facilities for the summer of 2021, which will probably be still affected by the COVID-19 pandemic. One of the key findings is that there is a great demand for the expansion of the supply of "product" typically offered by accommodation facilities with services and tourism packages included in the price of accommodation. More than 80 % of the respondents declared that these kinds of packages with additional "free" services would influence the choice of a particular destination or accommodation facility in a very positive way. The respondents would appreciate accommodation facilities to offer e.g. lending equipment for sport activities for free, free tickets to museums, castles, or other sites of cultural importance, horse rides, wellness and massages, degustation of wine or other popular local products. The respondents also specified the minimal requirements for a room or accommodation facility equipment: own bathroom, a TV, free Wi-Fi connection, and at least a small fridge; parking lot situated near the accommodation facility; a swimming pool and wellness would be an advantage, but it is not essential if the price of the accommodation is not high. If the restaurant is not a part of the accommodation facility, the possibility of using the fully-equipped kitchen to prepare own meals is very important for typical Czech tourists, because self-catering holiday is a preferred option for 24 % of the respondents. In terms of food, half board would be the right option for 40 % of respondents, while 28 % of them would prefer accommodation with breakfast and 8 % selected "all inclusive" in the questionnaire. As for the length of the stays in the domestic accommodation facilities during the summer 2020, the highest number of the respondents planned to spend there two weeks (33 %) or one week (26.5 %).

As for the "price", the mode was 22-45 USD per night (49 % of the respondents), but more than a quarter (26 %) of the respondents planned to book the accommodation for less than 22 USD per night. The price above 69 USD per night was acceptable for 5 % of respondents only. In terms of the "place", it could refer to the locations (in a broader context, the aforementioned destinations), or accommodation facilities equipment (referred to as the respondents' requirements), but also the most preferred type of accommodation facility. The results show that 50 % of the respondents intended to stay in small guesthouses with a capacity of up to 10 guests. Other types of accommodation were less preferred: large-capacity guesthouses – 18 %, 3 or 4-star hotels – 13 %, camping sites – 5 %, 1 or 2-star hotels – 4 %, spa resorts – 2 %.

The last P stands for "promotion", which refers to different types and channels of marketing communication with potential customers. In this case, the majority of the respondents rely especially on on-line reviews on destinations and accommodation facilities as well as the on-line presence represented by quality websites or social media profiles. When choosing accommodation, nearly all respondents claimed to use the internet as a basic source of information and for making reservations. The most frequently used source for choosing accommodation is Booking.com (54 %). They also frequently book a room directly on the accommodation facilities' web sites (after they had checked on-line reviews on Google) or on discount portals that are offering services, such as Slevomat.cz.

4 Discussion

Although the long-term impact of the COVID-19 pandemic on travelling and tourism have not been evaluated yet, recession, economic depression, and many different macroeconomic shocks including e.g. demand, supply, trade, investment, price level, financial stability, international cooperation, and economic growth as a result of the pandemic outbreak and temporary shutdown of factories and businesses can be expected as well as some changes caused by restrictions, border closures,

lockdowns, and health concerns, but also higher costs of transport and logistics services (Barua, 2020).

Based on the results of this research, it can be concluded that the impact of the coronavirus pandemic on the change of travel intentions and preferences is significant, and the shift towards domestic tourism shall be highlighted. The desire to visit natural sites, small towns with historical centers, and rural sites situated in various protected areas was observed. The southern part of the Czech Republic can be considered the most attractive region in the process of planning summer holidays in 2020 with regard to the COVID-19 pandemic. The most preferred protected areas mentioned by the respondents were the Bohemian Forest National Park, the Šumava Protected Landscape Area, and the Czech Krkonoše National Park. In the case of the Czech Republic, a change in tourism demand can be seen, as well as a shift towards domestic tourism. Similarly, the positive effect of the pandemic on domestic tourism was observed also in Ukraine and Azerbaijan (Rahmanov et al., 2020). Basically, strong domestic tourism is reported in the USA and China. In the case of the EU, domestic tourism is not so strong, although some EU countries like Italy, Spain, Germany, France, and UK would suffer economic losses resulting from the tourism collapse due to COVID-19 outbreak unless promoting domestic tourism, which is less income-elastic. This effort should be supported by combined and comprehensive policies that could save and revive the tourism sector (Islam and Fatema, 2020). For instance, the government of Jordan encouraged domestic tourism to reduce the impact on this sector by digital marketing and moderating the role of price, and the role of a mediator with a visible effect between digital marketing and domestic tourism intentions and realization as it may affect not only pre-visit decision, but also post-visit behaviour to establish an effective domestic tourism (Nofal et al., 2020). The Czech Republic experienced releasing of restrictions during the summer, but also restrictions, lockdowns, and closures of hospitality services and facilities and some tourism attractions imposed during the spring, autumn and winter season of 2020; the period for the Czech tourism sector recovery was thus quite short to include not only the demand, but also the supply.

Coronavirus global pandemic may provide an opportunity to transform tourism into a more socialized form, where the rights and interests of local communities are important, thus creating an impulse to set social and ecological justice for tourism after COVID-19 with respect to the social and ecological limits of the planet (Higgins-Desbiolles, 2020b). Although social distancing, closures, and lockdowns were introduced, spending time in the nature was suggested as a path to overcome negative impacts of isolation. In this context, protected areas and their importance for enabling the adaptation to the pandemic were highlighted (Ma et al., 2020). The desire for visiting rural areas, natural sites, and protected areas by Czech citizens has also been mentioned in this paper. Natural features such as landscape, weather conditions, and natural monuments are significant indicators of tourists' high satisfaction with the destination (Štumpf, Vojtko and Valtrová, 2018). However, higher demand, if realized, might become a challenge, a threat as well as an opportunity, for destination management and protected areas management, as it creates pressure on the destination and the environment. As for the possible environmentally positive effects, this global pandemic and the lockdown experience may lead people to appreciate environmental assets, and therefore it might play a role in tackling the climate change and biodiversity loss issues (Helm, 2020). On the other hand, protected areas naturally play a key role in halting biodiversity loss and buffering novel disease outbreaks through ecosystem integrity, but this ability might be negatively affected by increasing human pressure intensified by COVID-19 pandemic (Terraube and Fernández-Llamazares, 2020).

There are places where travel restrictions and protected areas closures have reduced the stress and pressure on these places, but in the places that remained opened, increase in both is visible and would probably occur in the closed areas once the restrictions are loosened (Corlett et al., 2020). Heavier traffic in

the protected areas, especially in national parks with little human impact and well-preserved and barely altered nature, shall result in monitoring of the state of environment, tourist traffic volume and trends, and impact of tourism on these location in order to develop and implement efficient management to conserve the values of the natural sites, modify conservation plans, and enable sustainable tourism (Olesiewicz et al., 2020). While some consider the effect of restricted movement and reduced economic activity beneficial for biodiversity conservation and nature protection, in Africa, Lindsey et al. (2020) foresee strongly negative net conservation impacts of COVID-19 due to the reduced funding, restrictions concerning the Operation Agencies, and increased human threats to nature including poaching. Anyway, increased visitor attraction and density in protecting well-known valuable areas might represent a threat not only for the environment, but also reduce locals' acceptance of tourism (Ryan and Silvanto, 2009), as well as deteriorate the quality of tourist experience, once the destination becomes overcrowded (Bushell, Staiff and Eagles, 2007). This is also the case of Český Krumlov, which is included in the UNESCO list, as stated by the respondents.

According to the respondents, the most attractive destinations include the South Bohemian and South Moravian regions. Bohemian Forest National Park and Šumava, as well as the Czech Krkonoše – Giant Mountains NP were also significantly represented in the sample; CHKO Beskydy, Bohemia Schwitzerland NP, CHKO Pálava, and UNESCO Lednicko-Valtický areal became other most preferred destinations. These results are similar to the results of the survey conducted by Soukup (2014) in the Ústecký region, where the respondents from the Czech Republic (sample of 1000 respondents aged 18-65 years) stated that South Bohemia, South Moravia, Bohemian Forest, Giant Mountains, Jeseníky, Beskydy, and Český ráj are the most attractive summer holiday destinations. The percentage of the responses mentioning South Bohemia (45 %), South Moravia (40 %), Bohemian Forest (37 %), and Giant Mountains (30 %) was significant, while Jeseníky, Beskydy, and Český ráj were attractive for 16 % of the respondents, and the share of other destinations in the sample was lower (0.4 % - 10 %). The South Bohemian region might be considered a key domestic tourism destination compared to the regions visited by Czech citizens, as in the years of 2012 - 2019, the South Bohemian region was the second most visited destination for longer domestic trips, and the most visited one in 2018. In most years, the most visited region was the Central Bohemian region. As for the shorter trips, the preferences change over time, and so does the position of the South Bohemian region. In 2019, longer domestic trips were usually made mainly to the Central Bohemian region, South Bohemian region, Hradec Králové region, Liberec region, South Moravian region, and Vysočina region, while the shorter ones were mostly to the Central Bohemian region, South Bohemian region, South Moravian region, Vysočina region, Plzeň region, and Moravian-Silesian region (ČSÚ, 2020). However, the share of Central Bohemian region is notably marginalized in our findings in comparison with the usual performance of the regions reported by the Czech Statistical Office, while the results of other regions are similar, with higher significance of the Moravian-Silesian region only. Monitoring of these areas and measuring the impact of tourism is suggested not only for the purpose of the biodiversity conservation and protected areas development and protection, but it can be also future direction of our research in the post-pandemic times.

5 Conclusion

The aim of the paper is to determine the changes in the plans of the Czechs for the 2020 summer holiday in reaction to the first set of government tough restrictions, such as closed borders or closed accommodation facilities introduced in the Czech Republic during the first wave of the COVID-19 pandemic in the spring of 2020. The next step was to identify specific preferences concerning the destinations and accommodation for summer holiday in 2020 of Czech inhabitants, who decide to spend their holiday in the Czech Republic because of the pandemic. The

data obtained from 637 respondents showed a significant shift in the summer holiday preferences and intentions due to the global pandemic and the related restrictions and uncertainty. The results showed a noticeable decline in the Czechs' intentions to spend summer holiday abroad. That meant an increase in planned domestic holiday, as well as the increase in preferences of one-day domestic trips, staying at own cottages, or staying home.

As for the preferences concerning the summer of 2020 in the Czech Republic, most respondents intended to spend their holiday mainly at natural sites and enjoy activities such as hiking, biking, swimming, and other forms of relaxation. The results showed that 50 % of the respondents intended to stay in small and cheaper guesthouses with a capacity of up to 10 guests rather than in 3- or 4-star hotels. In terms of the domestic destinations when planning the summer holiday in the spring of 2020, the most desired ones were the South Moravian region, which is well-known for its vineyards, and the South Bohemian region, especially the areas such as the Bohemian Forest National Park and the Šumava Protected Landscape Area with its popular water reservoir Lipno.

Considering the findings related to marketing mix of accommodation facilities, it can be concluded that there is a great demand for the expansion of the typically offered accommodation by additional free services that would be included in the price of accommodation, e.g. wellness, degustation of wine or local products, equipment for sport activities, or free tickets for sights and attractions in a particular destination. The majority of respondents agreed that these kind of packages with additional "free" services would motivate them to choose a particular accommodation facility or even destination, so this can be seen as relevant recommendations for hospitality and tourism industry for the summer of 2021, which is very likely to be still affected by the COVID-19 pandemic in some way.

Literature:

1. Barua, S.: Understanding Coronanomics: The economic implications of the coronavirus (COVID-19) pandemic. *SSRN Electronic Journal*. [online] 2020. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3566477
2. Bashir, M. F., Ma, B. J., Shahzad, L.: A brief review of socio-economic and environmental impact of Covid-19. *Air Quality, Atmosphere and Health*. 2020, 13, 1403–1409.
3. Baum, T., Hai, N. T. T.: Hospitality, tourism, human rights and the impact of COVID-19. *International Journal of Contemporary Hospitality Management*. 2020, 32(7), 2397–2407.
4. Burkart, A. J., Medlik, S. (1974). *Tourism: Past, present and future*. London: Heinemann. ISBN 9780434912407.
5. Bushell, R., Staiff, R., Eagles, P. F. J. (2007). *Tourism and protected areas: benefits beyond boundaries*. In: Bushell, R., Eagles, P. F. J. (Eds.), *Tourism and Protected Areas: Benefits Beyond Boundaries* (pp. 1-11). Cambridge: CABI Publishing. ISBN 9780851990224.
6. Corlett, R. T., Primack, R. B., Devictor, V., Maas, B., Goswami, V. R., Bates, A. E., Koh, L. P., Regan, T. J., Loyola, R., Pakeman, R. J., Cumming, G. S., Pidgeon, A., Johns, D., Roth, R.: Impacts of the coronavirus pandemic on biodiversity conservation. *Biological Conservation*. 2020, 246, 108571.
7. ČT24: *First three people infected with coronavirus in Czech Republic*. [online] 2020. Available at: <https://ct24.ceskatelevize.cz/domaci/3056228-v-cesku-jsou-tri-lide-nakazeni-koronavirem>
8. ČSÚ: *Základní tendence demografického, sociálního a ekonomického vývoje Jihočeského kraje – 2019*. České Budějovice: Český statistický úřad. [online] 2020. Available at: <https://www.czso.cz/csu/czso/zakladni-tendence-demografickeho-socialniho-a-ekonomickeho-vyvoje-jihoceskeho-kraje-2019>
9. Diedrich, A., García-Buades, E.: Local perceptions of tourism as indicators of destination decline. *Tourism Management*. 2009, 30, 512-521.

10. Eugenio-Martin, J. L., Campos-Soria, J. A.: Economic crisis and tourism expenditure cutback decision. *Annals of Tourism Research*. 2014, 44(1), 53-73.
11. Faladeobalade, T. A., Dubey, S.: Managing Tourism as a Source of Revenue and Foreign Direct Investment Inflow in a Developing Country: The Jordanian Experience. *International Journal of Academic Research in Economics and Management Sciences*. 2014, 3(3), 16-42.
12. Fennell, D. A.: Technology and the sustainable tourist in the new age of disruption. *Journal of Sustainable Tourism*. [online] 2020. Available at: <https://www.tandfonline.com/doi/full/10.1080/09669582.2020.1769639>
13. Fernandes, N.: Economic Effects of Coronavirus Outbreak (COVID-19) on the World Economy. *SSRN Electronic Journal*. [online] 2020. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3557504
14. Frechtling, D. C.: *Assessing the economic impacts of travel and tourism - Introduction to travel economic impact estimation*. In: Richie, J. R. B. & Goeldner, CH. R. (Eds.), *Travel, Tourism and Hospitality Research: A Handbook for Managers and Researchers*. New York: John Wiley & Sons, 1994, pp. 359-366.
15. Gajdošík, T., Gajdošíková, Z., Stražanová, R.: Residents' Perception of Sustainable Tourism *Destination Development - A Destination Governance Issue*. *Global Business & Finance Review*. 2018, 23(1), 24-35.
16. Gallego, I., Font, X.: Changes in air passenger demand as a result of the COVID-19 crisis: using Big Data to inform tourism policy. *Journal of Sustainable Tourism*. [online] 2020. Available at: <https://www.tandfonline.com/doi/full/10.1080/09669582.2020.1773476>
17. Garau-Vadell, J. B., Gutierrez-Taño, D., Diaz-Armas, R.: Economic crisis and residents' perception of the impacts of tourism in mass destination. *Journal of Destination Marketing & Management*. 2018, 7, 68-75.
18. Gascón, J.: Tourism as a right: a „frivolous claim“ against degrowth? *Journal of Sustainable Tourism*. 2019, 27(12), 1825-1838.
19. Golets, A., Farias, J., Pilati, R., Costa, H.: COVID-19 Pandemic and Tourism: The Impact of Health Risk Perception and Intolerance of Uncertainty on Travel Intentions. *Preprints*. [online] 2020. Available at: <https://www.preprints.org/manuscript/202010.0432/v1>
20. Hall, C. M., Scott, D., Gössling, S.: Pandemics, transformations and tourism: be careful what you wish for. *Tourism Geographies*. 2020, 22(3), 577-598.
21. Harrison, D.: Towards Developing a Framework for Analysing Tourism Phenomena: A Discussion. *Current Issues in Tourism*. 2007, 10(1), 61-86.
22. Hateftabar, F., Chapuis, J. M.: How resident perception of economic crisis influences their perception of tourism. *Journal of Hospitality and Tourism Management*. 2020, 43, 157-168.
23. Helm, D.: The Environmental Impacts of the Coronavirus. *Environmental and Resource Economics*. 2020, 76, 21-38.
24. Higgins-Desbiolles, F., Russell-Mundine, G.: *Absences in the volunteer tourism phenomenon: the right to travel, solidarity tours and transformation beyond the one-way*. In: Lyon, K. & Wearing, S. (Eds.), *Journeys of Discovery in Volunteer Tourism*. Cambridge: CABI Publishing, 2008, pp. 182-194.
25. Higgins-Desbiolles, F.: The „war over tourism“: challenges to sustainable tourism in the tourism academy after COVID-19. *Journal of Sustainable Tourism*. [online] 2002a. Available at <https://www.tandfonline.com/doi/full/10.1080/09669582.2020.1803334>
26. Higgins-Desbiolles, F.: Socialising tourism for social and ecological justice after COVID-19. *Tourism Geographies*. [online] 2002a. Available at: <https://www.tandfonline.com/doi/full/10.1080/14616688.2020.1757748>
27. Chang, CH. - L., McAleer, M., Ramos, V.: A Charter for Sustainable Tourism after COVID-19. *Sustainability*. 2020, 12(9), 3671.
28. Cheer, J. M.: Human flourishing, tourism transformation and COVID-19: a conceptual touchstone. *Tourism Geographies*. 2020, 22(3), 514-524.
29. Ianioglo, A., Rissanen, M.: Global trends and tourism development in peripheral areas. *Scandinavian Journal of Hospitality and Tourism*. 2020, 20(5), 520-539.
30. Ioannides, D., Apostolopoulos, Y.: Political Instability, War, and Tourism in Cyprus: Effects, Management, and Prospects for Recovery. *Journal of Travel Research*. 1999, 38, 51-56.
31. Islam, M. M., Fatema, F.: Covid-19 and Sustainable Tourism: Macroeconomic Effect and Policy Comparison among Europe, the USA and China. *Assian Business Review*. 2020, 10(1), 53-60.
32. Korstanje, M. E.: El COVID-19 y el turismo rural: una perspectiva antropológica. *Dimensiones Turísticas*. 2020, 4, 179-196.
33. Lindsey, P., Allan, J., Brehony, P., Dickman, A., Robson, A., Begg, C., Bhammar, H., Blanken, L., Breuer, T., Fitzgerald, K., Flyman, M., Gandiwa, P., Giva, N., Kaelo, D., Nampindo, S., Nyambe, N., Steiner, K., Parker, A., Roe, D., Thomson, P., Trimble, M., Caron, A., Tyrell, P.: Conserving Africa's wildlife and wildlands through the COVID-19 crisis and beyond. *Nature Ecology & Evolution*. 2020, 4, 1300-1310.
34. Ma, A. T. H., Lam, T. W. L., Cheung, L. T. O., Fok, L.: Protected areas as a space for pandemic disease adaptation: A case of COVID-19 in Hong Kong. *Landscape and Urban Planning*. 2020, 207, 103994.
35. Mackenzie, S. H., Goodnow, J.: Adventure in the Age of COVID-19: Embracing Microadventures and Locavism in a Post-Pandemic World. *Leisure Sciences*. [online] 2020. Available at: <https://www.tandfonline.com/doi/full/10.1080/01490400.2020.1773984>
36. Navrátil, J., Pícha, K., Martinát, S., Knotek, J., Kučera, T., Balounová, Z., White Baravalle Gilliam, V. L., Švec, R., Rajchard, J.: A model for the identification of areas favourable for the development of tourism: a case study of the Šumava Mts. and South Bohemia tourist regions (Czech Republic). *Moravian Geographical Reports*. 2013, 21(1), 25-40.
37. Nofal, M. I., Al-Adwan, A. S., Yaseen, H., Alsheikh, G. A. A.: Digital marketing effect to intention to domestic tourism during COVID-19 in Jordan. *Periodicals of Engineering and Natural Sciences*. 2020, 8(4), 2471-2483.
38. Olesniewicz, P., Pytel, S., Markiewicz-Patkowska, J., Szromek, A. R. & Jandova, S.: A Model of the Sustainable Management of the Natural Environment in National Parks – A Case Study of National Parks in Poland. *Sustainability*. 2020, 12(7), 2704.
39. Papatheodorou, A., Rosselló, J., Xiao, H.: Global Economic Crisis and Tourism: Consequences and Perspectives. *Journal of Travel Research*. 2010, 49(1), 39-45.
40. Pratt, S.: The economic impact of tourism in SIDS. *Annals of Tourism Research*. 2015, 52, 148-160.
41. Proença, S., Soukiazis, E.: Tourism as an economic growth factor: a case study for Southern European countries. *Tourism Economics*. 2008, 14(4), 791-806.
42. Rahmanov, F., Alieva, R., Rosokhata, A., Letunovska, N.: Tourism Management in Azerbaijan Under Sustainable Development: Impact of COVID-19. *Marketing and Management of Innovations*. 2020, 3, 195-207.
43. Ritchie, J. R. B., Crouch, G. I.: *The competitive destination: a sustainable tourism perspective*. Wallingford: CABI Publishings, 2003. ISBN 0-85199-664-7.
44. Ryan, J., Silvanto, S.: The World Heritage Site List: The Making and Management of a Brand. *Place Branding and Public Diplomacy*. 2009, 5(4), 290-300.
45. Sheldon, P. J., Abenoja, T.: Resident attitudes in a mature destination: the case of Waikiki. *Tourism Management*. 2001, 22(5), 435-443.
46. Smeral, E.: The Impact of the Financial and Economic Crisis on European Tourism. *Journal of travel research*. 2009, 48(1), 3-13.
47. Smeral, E.: Impacts of the World Recession and Economic Crisis on Tourism: Forecasts and Potential Risks. *Journal of Travel Research*. 2010, 49(1), 31-38.
48. Soukup, K.: *Image Ústeckého kraje jako turistického regionu – výzkum mezi obyvateli ČR. Ústí nad Labem: Ústecký kraj*, 2014.
49. Šauer, M., Repík, O.: *Cestovní ruch a ekonomický rozvoj*. In: Šauer, M., Vystoupil, J., Holešinská, A., Palatková, M., Písková, M., Zelenka, J., Fialová, D., Vágner, J., Haláček, P., Repík, O. & Petr, O. *Cestovní ruch*. Brno: Masarykova univerzita, 2015. pp. 162-179.

50. Štumpf, P., Vojtko, V., Valtrová, B.: Satisfaction of European Tourists – Benchmarking of EU Countries. *Global Business & Finance Review*. 2018, 23(1), 1-14.
51. Terraube, J., Fernández-Llamazares, Á. Strengthening protected areas to halt biodiversity loss and mitigate pandemic risks. *Current Opinion in Environmental Sustainability*. 2020, 46, 35-38.
52. Tuhin, K. W., Majumder, T. H.: An Appraisal of Tourism Industry Development in Bangladesh. *European Journal of Business and Management*. 2011, 3(3), 287-297.
53. Wiedenhoft Murphy, W. A.: Touring the Troubles in West Belfast: Building Peace or Reproducing Conflict? *Peace & Change*. 2010, 35(4), 537-560.
54. Williams, C. C.: Impacts of the coronavirus pandemic on Europe's tourism industry: Addressing tourism enterprises and workers in the undeclared economy. *International Journal of Tourism Research*, 2020, 1-10.
55. Žemla, M.: Tourism destination: The networking approach. *Moravian Geographical Reports*. 2016, 24(4), 2-14.
56. Zenker, S., Kock, F.: The coronavirus pandemic – A critical discussion of a tourism research agenda. *Tourism Management*. 2020, 81, 104164.

Primary Paper Section: A

Secondary Paper Section: AE, AH

THE ART OF TOURISM MARKETING AS A WAY TO A SUSTAINABLE RESTART AFTER THE PANDEMIC

^aJARMILA ŠALGOVIČOVÁ, ^bDENISA JÁNOŠOVÁ,
^cTAMÁS DARÁZS, ^dRENÁTA SÁDECKÁ

*University of Ss. Cyril and Methodius, Faculty of Mass Media
Communication, Nám. J. Herdu 2, 917 01 Trnava*
email: ^ajarmila.salgovicova@ucm.sk,
^bdenisa.janosova@ucm.sk, ^ctamas.darazs@fmk.sk,
^dsadecka2@fmk.sk

This contribution is a partial result of the project Vega no.1/0606/21 Change in preferences in buying behaviour of consumers in the context of the dynamics of marketing communication tools development.

Abstract: The paper's primary goal is to point out tourism development options through a solitary element with the potential of photogenicity and aesthetics, which can complement other tourism offer and point out the positive and negative effects of applying such an element in the complex of tourism. The analytical part of the work describes and evaluates the impacts of the installation of a work of art called Súľovská visual pyramid, which managed to increase the number of visitors to the particular site by about 250% in five years – but was also - based on negative experiences of local people - disassembled. Based on this experience, we argue that development through the arts can also be unsustainable if possible negative externalities are not considered in advance in planning and management.

Keywords: art; communication; culture; tourism marketing; sustainability of tourism

1 Introduction

Tourism in Europe is currently facing several challenges, in particular volatile economic conditions and fiscal pressures, the need to strengthen its share of the world tourism market, growing competition from other destinations such as BRICS countries (Brazil, Russia, India, China, South Africa), changing traveler's behaviour, climate change, seasonal fluctuations, etc. (Alam, M. S., & Paramati, S. R., 2016). The Covid-19 pandemic can undoubtedly be ranked among the most significant threats today (Darázs, T., Šalgovičová, J., 2021). According to the World Tourism Organization (UNWTO), tourism accounts for 3-5% of global GDP, employment for 7-8% and export for 30%. It still, unfortunately, does not receive sufficient political and economic recognition.

The conditionality of the interrelationship between tourism and culture, where tourism acts as part of the cultural system and as a stimulation tool of the cultural environment, is obvious. We assume that tourism provides an attractive space for sharing cultural values, protection, and development (Font, X., & McCabe, S., 2017). On the other hand, cultural values in tourism create an original primary offer, the unique one in the market and guaranteed long-term development. In today's society, tourism plays an important role and is expected to grow further, along with its increasing importance. Tourism ceases to be understood only in the economy's context, i.e., being an essential sector of the economy, but it is perceived as a social, human and cultural phenomenon. Traveling becomes an integral part of the modern way of life, work and leisure, as well as the need to address tourism comprehensively, i.e., as an important phenomenon with its specifics and regulations and rules. To keep the sustainable development of tourism, there arises a need to research its overlaps in various scientific disciplines and view tourism from an economic point of view and the point of view of cultural sciences (Fodness, D., 2017). Tourism is an important cultural system within culture, composed of cultural elements and complexes. It also embraces tangible and intangible cultural values. According to Gössling, culture and its activities are also of great benefit to municipalities and cities, e.g., it is about strengthening social cohesion; improving the image of the place; reducing criminal activity and acts of violence; promoting interest in the local environment; community self-confidence development; building partnerships between the private and public sectors; identity research and confirmation; strengthening organizational skills; promoting independence; stimulating visions for future development (Gössling, S., 2016).

2 Theoretical background

In the theoretical part of our paper, we deal with tourism's connection with the region and understand culture as an essential part of tourism. We explain these areas, forming the basis of this paper while being its integral part. We also focus on tourism marketing as a part of regional marketing, which can significantly affect the influx of tourists to a particular area.

Importance of tourism in the region

Tourism is an economic activity, able to generate growth and employment in the EU while contributing to economic and social development and integration, especially in rural and mountainous areas, coastal regions and islands, peripheral and remote regions (Bec, A., Moyle, B., & Moyle, CL, 2018). The European tourism sector, consisting of around 1.8 million mainly SMEs, employing around 5.2% of the total workforce (which is around 9.7 million jobs with a significant share of young people), generates more than 5% of the EU GDP, constantly increasing. Thus, tourism is the third largest socio-economic activity in the EU, after the trade, distribution, and construction business. Concerning connected and securing sectors, the contribution of tourism to GDP is even higher, given that it creates more than 10% of the European Union's GDP and around 12% of jobs (Anastasia, V., 2015). If we compare developments over the last ten years in this respect, employment growth in the tourism sector has always been more visible and forward than in other sectors of the economy.

Currently, tourism is seen primarily as an economic sector and thus a bearer of economic functions and effects. Tourism performs numerous functions in the economy and is therefore referred to as the tourism industry (Bramwell, B., & Lane, B., 2012). Of course, given the services' very commercial nature and the benefits perceived in the microeconomic and macroeconomic understanding, its economic aspects cannot be refuted.

Tourists and occasional visitors perceive the region from a different point of view. They perceive the landscape, the environment, the services offered and their quality, the cultural, sports and recreational opportunities, the safety, the cleanliness, the friendliness of the locals and the language skills of the people they meet during their stay. The visitor and the tourist come to the region only when there is something to be offered. Therefore, every region in tourism should ask the question: What is unique with us, why should tourists visit us? Although regions have not recently realized the importance of attracting tourists, not all participants in the regional marketing process are aware of the need to use marketing and marketing tools to their advantage (McCartney, G., Butler, R., & Bennett, M., 2008). It may be the critical aspect to their continued existence, which will ultimately support their very competitiveness.

Understanding tourism and culture

For a multi-contextual relationship between tourism and culture, its definition is a complex process where both the cultural and economic aspects of tourism need to be considered and a broad-spectrum understanding of culture and tourism (Richards, G., & Marques, L., 2012). The relationship between tourism and culture can be understood from different perspectives:

- Culture is understood as a hierarchically higher system – we understand tourism as a product of a person who is part of the culture.
- Culture is understood as a hierarchically lower system - we understand the culture in tourism as a product and tourism is a determinant of culture.
- Culture and tourism together form one equal system - both represent two complex systems where we identify mutual intersections and functions.

The goals of connecting tourism with culture are based on its cultural context. Here we find the fulfilment of the consumer's cultural needs supplemented by economic goals that are on the side of the provider of tourism services (Carballo, F. R., 2015). This fact complements our expectation of the intertwining of tourism goals with culture. It also implies the need for knowledge of cultural laws among tourism professionals. If we look at culture as a way of life of a particular community, tourism, the activity of people connected with spending their free time, belongs directly to this category. The bearer and creator of tourism is the human being. Everything we can think of, what man has created, we understand as part of a particular culture (Bramwell, B., 2017). From this context, the connections between tourism and culture are derived. Thus, tourism activities ensure meeting different cultures and the exchange of cultural values in a particular region/territory. In the life and culture of residents, tourism gets various forms. For the local community, it can represent leisure activity (e.g., participation in a festival attended by locals and tourists), source of income (in major tourist destinations it even becomes the primary job), direct or indirect encounter with foreign culture bringing cultural exchange, source of economic, social and cultural development on a regional scale. For culturology, tourism is proof of the development of human society.

Marketing and culture in tourism

Marketing as a separate theoretical discipline was applied for the first time in the USA; it was rather a response to the challenge of an industrially advanced economy (mass consumption). In Slovakia, the initial development of marketing was present by 1989 – in the late 70's and early 80's of the 20th century within the concept of "socialism with a human face". Later, as a result of the "normalization" process, marketing topics were divided into disciplines (business strategies, advertising, market research, etc.) and their content was "cleansed" of ideas friendly to the system of the economy. The marketing renaissance in the Czechoslovak Socialist Republic occurred after 1989 (Žaloudek, K., 1996). We cannot determine a unified definition for marketing because it deals with and is researched from several perspectives. This issue is just affecting the inconsistency of the marketing concept. From the economic point of view, marketing represents a global business strategy focusing on market requirements and the market itself (Hall, C. M., 2014). The „spiral“ of services with the potential to meet human needs is constantly evolving and new services are emerging. The visitor, a subject of cultural tourism, satisfies the needs connected with travel and cognition. These needs are satisfied by free (air, water, sand, etc.) and economic goods (services). Cultural marketing aims to ensure the largest possible market share, maintain or increase the number of visitors, and create a set of satisfied clients (Jones, P., Clarke-Hill, C., Comfort, D., & Hillier, D., 2008). The following principles apply in cultural marketing:

- Inside - Out process, predetermining the initial production of a specific product and then its placement on the market.
- Artistic goals are at the forefront of cultural marketing and are subordinate to other goals. A key attribute for marketing is its proper timing and launch. It is necessary to consider the difference between consumer-attractive products and projects that are interesting from an artistic point of view within marketing culture.
- Marketing in culture, which intends to apply to a specific region, should be based on its independence (we mean mainly independence from market influence), but on the other hand, it is necessary to pay attention to the consumer and his interests.

Within the market environment, concerning culture, or cultural heritage or art in general, we divide several types of visitors, based on the periodicity of visits:

- Occasional visitors - their frequency is set at once a year. The visitors are aware of the place or specific cultural entity but still prefer another place to spend their free time.

- Regular visitors – as evident, these are visitors visiting cultural sites, institutions, etc., regularly. Their frequency was defined several times a year. In marketing in culture, subscription programs are used to retain these visitors. However, these programs are not applicable everywhere; for example, it applies to artificially created cultural attractions.
- Tourists - tourists form a separate group of customers of a given cultural monument. To visit a particular site, they have to cover a certain distance. As part of marketing activities in culture, the distribution itself is recommended, such as tourists' recommendations of the monument they visited, attraction or institution to other people. In this regard, the region could distribute various leaflets, ads in newspapers, radio or television, and develop the trendy sharing of photos on social networks.
- Local visitors - this group of customers is perhaps the most demanding, as to re-attract them, it is necessary to constantly develop new activities, such as special events, new exhibitions, various entertainment or educational programs (Font, X., & McCabe, S., 2017).

Tools helping a specific city or region to tailor the offer to the target market are included in the marketing mix. We include in the marketing mix everything that could affect the product demand in a specific area (Dolnicar, S., & Ring, A., 2014). To the essential 4P (product, price, place, promotion) marketing mix, several authors add the following Ps in their publications: people; packaging; programming; partnership; processes and political power.

Product in culture

In general, we can define a product as anything we can offer in the market and subsequently satisfy the needs of the customer buying it (Li, H., Chen, J. L., Li, G., & Goh, C., 2016). A product in culture can have a tangible (monuments, museums, attractions,..) and an intangible (festivals) character. A specific feature of tourism in the context of culturology is that local residents supplement the target group of tourism participants, i.e., tourism is also intended for the local community/population. Carballo argues that the most critical characteristic distinguishing a product from a product in culture is its uniqueness (Carballo, F. R., 2015). In culture, every product is very particular and therefore unique, as is its perception by individual customers or consumers. The product in culture can be analyzed from different perspectives, involving four different levels: the core of the product, the product itself, the expected product, and the extended product (Estevão, C., Garcia, A. R., Filipe, S. B., & Muniz, A. C., 2017). The core of the product is the benefit that the cultural good or service brings to the consumer. It is, e.g., an artistic, aesthetic, emotional or social experience. The product itself represents a specific offer of a place or region, and thus it is primarily about the offer towards the target market. Within the region, historical monuments or other attractions artificially created to make the area more attractive can be presented. The expected product includes the consumer's regular expectations regarding the product. Visitors expect from the product, e.g., its fast availability, attractiveness, photogenicity, etc. The extended product consists of other products, services or benefits that the consumer would not expect as a standard.

Many products in culture have the nature of services. For example, a theater performance, a visit to a gallery or a museum. Services have certain features that physical products lack, but they can affect other tools of the marketing mix in some ways. We classify cultural services among the „quintary“ services (Bec, A., McLennan, C., & Moyle, B., 2016). Their main feature is that somehow they change and improve their recipients, such as education and recreation. Within education, it can also be educational trails, which are built artificially in the region with the purpose of education.

3 Examples of good practice combining art and tourism in central Europe capable of triggering action to increase regional traffic

The combination of culture, art and tourist attractions in these countries shows that even with relatively small resources, art and culture can be used as an offer and a tool of promotion if aligned with community requirements even in relatively unattractive places.

Slovakia

Forest sauna in Spišský Hrhov

At the foot of the forest in Spišský Hrhov, in an old orchard with a view of Spišský castle, there is a sauna, original in its architecture and concept. It is accessible free of charge to anyone who books it. The sauna has an unconventional shape on the outside, but inside it is built according to traditional techniques. There is no electricity, heated by wood-burning and cools with water from the stream. The sauna was built based on a public collection, with a lot of volunteer work done. The village of Spišský Hrhov introduced this revolutionary idea, the forest sauna project together with the "Čierne diery" association and created an object interesting for its architecture. A municipal enterprise carried out the whole construction. Architects from the Woven association created the design. This attraction is an example of how to connect various subjects using the potential that the environment offers for tourism.

Figure 1 Forest sauna in Spišský Hrhov with the unique view over the Spišský castle



Source: <https://www.archinfo.sk/diela/exterior/lesna-sauna-spissky-hrhov.html>

Forest sauna and ladder to heaven in the village Dúbravica

Dúbravica is a village in the district of Banská Bystrica. The village has less than 500 inhabitants and outside the district can be considered unknown. Nevertheless, it hides several interesting tourist attractions, also a unique architectural piece of art. Interesting works in Dúbravice were initiated by the civic association "Peripheral Centers", the aim of which is, among other goals, to connect art with the local unique natural environment. The civic association calls its local effort "Kunstdorf", a cultural village. Artists from all over Slovakia and from across the border cooperate mutually in Dúbravice. The result is art installations, which also serve as tourist attractions, increasing the region's awareness and increased visits.

Figure 2 Work in Dúbravica – Forest sauna



Source: www.oazy.sk

Figure 3 Work in Dúbravica – Ladder to heaven right after being installed



Source: www.oazy.sk

Forest megaphone in Zlatá Baňa

To increase the forest's attractiveness for tourists in eastern Slovakia, four young men from the civic association Hlas lesa (Sound of the forest) came with the brilliant idea. When a person sits in it, the sounds of the surrounding nature multiply. One hears birds singing, the hum of trees or the sound of the forest. The municipality contributed with land to the civic association and the local beer brand covered the financial costs of building a megaphone by the amount of 2905€ The construction demonstrates that creating art as an attraction of tourism can be done in various ways, but essential in this case was the activation of a small group of people's endogenous potential.

Figure 4 Forest megaphone and its founders



Source: <https://www.severovychod.sk/>

Observation tower, barrel-shaped

The dominant of the Tokaj wine region in Slovakia is a 12-meter high observation tower, shaped like a wooden barrel. Together with a gazebo and a children's playground, a tower is a resting place for tourists, cyclists, and families with children. When climbing to the top, a view of the Tokaj region and its vineyards is incredible. This element is a demonstration of harmony while combining the art, tourist attractions and the environment.

Figure 5 Observation tower, barrel-shaped



Source: <https://www.aktuality.sk>

Love bench as an element completing the synergy effect of other attractions The bench above the village of Poniky offers a view of the natural scenery and complements the region's offer, which unfortunately has no significant tourist "attraction" but several

small attractions, showing the ability of natural promotion based on their photogenicity.

Figure 6 Bench of love



Source: <https://www.aktuality.sk>

„Megabench“ Gardeon in Kláštor pod Znievom

The bench on the hill above the village of Kláštor pod Znievom is an example of how a business entity's activity can reach the development potential of the entire region. The bench is the initiative of a local businessman in construction, as his tribute to respect the memories of walking trips with his father on the hill where he had the bench built. Due to its photogenicity, the bench can attract visitors to the village, where the relatively unknown castle to the visitors is located, or the beautiful alpine nature and the associated tourism.

Figure 7 Megabench Gardeon



Source: www.slovago.sk

Bench on the top of Čipčie hill

The bench on the Čipčie hill is an example of the region's development through imaginative groups, as mentioned by Govers. Volunteers placed the bench on the hill with the intent to develop tourist opportunities in their area. These volunteers chose a picturesque view, which can be reached after about two hours of hiking along the route, which they also marked very well.

Figure 8 Bench on the top of Čipčie hill



Source: www.turisticky.sk

Czech Republic

Open door at the top of Pancír hill

Pancír hill and its surroundings offer visitors several attractions and points of interest. However, the hill does not have an official peak point, so the local association decided to design the local environment with a door that opens into the surrounding nature and creates a symbolic peak. This door is another example of activating the endogenous potential of the community

Figure 9 Door at the peak of Pancír hill



Source: www.kudyznudy.cz

Architectural viewpoint Salaš

A private investor initiated the viewpoint. It is unique in its architecture, having the potential to increase the interest of tourists in this attraction, the nature in the area and architecture as well.

Figure 10 Architectural view Salas



Source: www.rozhlednasalas.cz

Trail above vineyards

The observation tower is architecturally unique, it stands out in the surrounding country more visible than usual and as one of the few observation towers in the Czech Republic, it is barrier-free. Through aesthetic processing, it offers a unique type of experience in a unique place for people who are often facing barriers in their lives and every wine lover.

Figure 11 Trail above vineyards – Kobylí



Source: Magazine INTRO, 2019.

Bell tower in Horečky and municipal inn - Rekovice

The bell tower in Horečky is an example of a small detail set in picturesque nature, offering many tourist attractions. However, it is an excellent example of successful cooperation between the municipality and modern architectural design. The cooperation

began with the reconstruction of changing rooms in the village's sports facilities, but the result of its success are many small examples of the harmony of modern architecture with nature, such as the local village inn, bell tower, or other buildings and details in the village and its surroundings.

Figure 12 Belltower



Source: www.mrva.net

Goethe Viewpoint - Karlovy Vary

Viewpoint from 1889 in the neo-Gothic style. A great example of the fact that even a hundred years ago, architects made sure that the tourist attractions matched the surrounding environment, as with this building, complementing the visitor's possibilities to Karlovy Vary.

Figure 13 Viewpoint close to Karlovy Vary



Source: Magistrate of Karlovy Vary

Observation place Durch

The idea and implementation is the activity of the family company Jánošík, producing windows under the hill where the Durch observatory is located. "I was thinking about redesigning our billboards. In the end, the desire to revolt against unclean nature was combined with advertising with our corporate philosophy of clean views. Overnight, we canceled all the billboards and began to create the Durch Observatory with the money we saved – expressing our support for a clear view." This attraction is a successful example of how a company engaged in activities other than tourism can develop an activity that develops tourism and a demonstration of the positive externality of business in the region.

Figure 14 Observation place Durch



Source: www.archinfo.sk

Hungary

Round shaped sightseeing – Balatonboglár

In the 1950s, the political leadership decided that an aluminum structure that used to be part of the Hungarian stand at the World's Fair in Brussels in 1956 would be a suitable tourist "attraction" for foreign tourists bringing the foreign exchange to the country. Even after many reconstructions, tourists enjoy the magnificent view from this building, connecting the turbulent history, architecture, and direct intention of developing tourism on the shores of Lake Balaton.

Figure 15 Sightseeing Balatonboglár



Source: <https://csodalatosmagyarorszag.hu/>

Bridge in the sky – Observation point – Pannonhalma

The view from the hill in the shape of a church symbol above the village of Pannonhalma in Hungary is an example of community cooperation, bringing together the church, the municipality and the administrator of locally protected forests to provide a tourist experience, a more accessible path and the possibility of easier reachable inner peace of believers. A perfect example is this building, bearing a historical person's name and emphasizing the importance of the site.

Figure 16 Boldog Mór Kilátó



Source: www.csodalatosmagyarorszag.hu

Austria

Sternenbalkon

The „Star balcony“ might not even appear on this list because similar examples of good practice such as this one have already been shown more when the local community caught on and built something. However, the Star Balcony above the alpine lake, surrounded by local farms, is unique in that the community has made it the core of the product and an extended product. The local farmers cooperated and offered the possibilities of experiential gastronomy. It is done by local farmers creating a unique „dinner package“ or another meal type according to the preference of the guests preparing it for a set hour at this particular attraction. Thus, this attraction is an example of the explicit economic development of local farmers thanks to a tourist attraction.

Figure 17 Viewpoint close to Karlovy Vary



Source: www.millstaettersee.com

Albania

Benja Thermal Pools

Albania is not at the top of the European chart, neither by size nor by the countries' economic development. However, it works with symbols. In the case of Albania, it is a bridge. Albania is characterized by stone bridges, the most important of which is in the city of Mostar. An example of a thermal spring, which is a tourist attraction based on its natural potential, is not included in this paper based on its characteristics, but on the Bridge that Albania recently built close, thus forming a natural part of nature, and the symbol of Albania in the photo documentation of tourist guides.

Figure 18 Natural thermal lake and bridge in the background



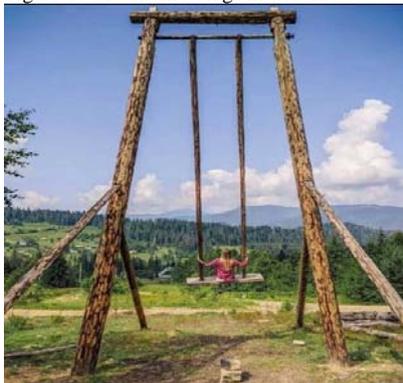
Source: <https://www.intoalbania.com/>

Ukraine

Swings in the Transcarpathian part of Ukraine

Ukraine, like Albania, is one of the well visible examples of unused natural potential. Nevertheless, this country can boast many sights, especially of a natural origin. The swings, located on the Ukrainian Carpathians' hills, that the local people can develop and beautify their environment. Nature and technique used, correspond to their financial capabilities. However, the existence of "bottom-up" pressure to build new values and sites is essential to our research.

Figure 19 Mountain swings in Ukraine



Source: www.unsplash.com

4 Methodology

The paper aims to clarify the possibilities and impacts of combining the art and attractions of tourism into one piece. The work maps examples of good practice of combining symbolism, art and aesthetic architecture in penetration as an attraction of tourism in several European countries with different economic and natural characteristics. The research part of the paper deals with analysing the overall impact of building a tourist attraction in a specific area with the installation duration of 5 years. The analysis of the negative and positive externalities evoked by this initiative throughout its duration brings essential insights to those interested in raising tourism in a particular area through tourism attraction with penetration into art.

The research part of the paper works with data obtained through qualitative and quantitative research methods. Qualitative data are obtained through in-depth interviews with local government officials, local citizens as well as entrepreneurs. The qualitative data used in the research we got through a predetermined sample of 27 business entities. Thanks to this sample, while including all municipality subjects providing gastronomic services, accommodation services in the municipality, and entities in retail, the data are deterministic based on a deeply researched sample of the statistical survey.

During the statistical survey, respondents were asked several primary and control questions, finding out their opinions and attitudes.

5 Results

The visual pyramid in Súľov as an example of the good practice of combining art and tourism

During the research, we found out that there is very little empirical research on the involvement of art in the tourism complex in the current theory of tourism marketing. Therefore, this paper provides knowledge about the impacts of the application of art as a product of tourism and maps the influences, context, and knowledge that this unique practice provided in a particular place with a set duration of time.

Research into the influence of the visual pyramid in the village of Súľov-Hradná in the Central European state of Slovakia brings a unique opportunity to map the life cycle of an art installation acting as a tourist attraction in nature. The Visual Pyramid (Figure 20) was an 18-meter-long work of art located in mountain scenery in the village of Súľov-Hradná, which was installed in the village in 2015 with a limited duration, but as a result of negative impacts on autochthony people, caused by a positive impact on local tourism, this art was disassembled earlier than planned. It is the possibility of mapping the life cycle of a given installation and the possibility of recording and analyzing quantitative and qualitative data on the impacts of this activity on the territory characterized by being geographically bounded by natural obstacles which, in addition to tourism, create a barrier. Surrounded by mountains with the possibility of measuring this installation's impacts, this example makes a clear statement capable of the effects of the combination of art and tourism and based on its story and conscious impacts, recommendations could be made for other communities.

Figure 20 Profile of the pyramid in Súľov



Source: www.visit.trencin.sk

Short overview

The wooden pyramid was installed in nature based on a contractual legal relationship from 2015 to 2020. The visual pyramid was a place where tourists hid from the sun and rain, enjoying “framed” views of the surrounding nature in every season. Slovak artist Juraj Gábor created the artwork. His work has initially been installed in the interior of a gallery in Zlín, Czech Republic. At the open end of the construction, films from nature were screened. The author decided to replace the recorded recordings with a living landscape. As a result of the positive social bonds between the author, other artists from northern Slovakia, and the mayor of the village of Súľov-Hradná, the installation was subsequently located on a meadow above the village of Súľov-Hradná. The attraction became the highlight very quickly. The number of tourists in the village increased almost as soon as the first shots of the “framed” (Figure 21) Súľov hills appeared in the media and social networks.

Figure 21 View from the visual pyramid



Source: www.dafson.sk

The visual pyramid had been visited by more than 30,000 people a year, which was also the reason for the earlier attraction disassembly. The municipality soon introduced a “parking tax”, this financial income provides the only approximate record that the municipality has about this attraction's financial benefits. It should be noted that the municipality themselves claim that the records were very inaccurate and no fund was kept and there was no idea of setting up the fund focused on the future development of tourism. However, such an increase in visitors also brought negative externalities. The biggest problem for the village was mainly undisciplined tourists. Although there was a paid parking lot available in the village, many tourists, also following the advice from social networks and blogs, parked for free wherever they found a place, which was often on private land or in nature. It was no exception that the locals could not leave their homes and garages due to undisciplined tourists and blocked roads. They also lacked privacy and especially peace. The visitors were not environmentally friendly either. Some, out of their pure comfort, drove to the pyramid directly. Others covered the area with garbage, and even the locals found empty bottles in their gardens. Considering these facts, the municipality proceeded to the earlier than planned disassembly of this attraction, mostly due to the negative general atmosphere caused by the locals' experience.

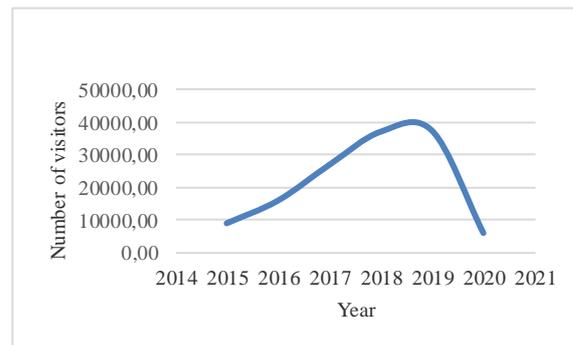
According to the municipality representatives, based on their own experience, it is necessary to think about the infrastructure, not only to build attractions when building tourist attractions. The municipality currently cannot do so due to the limited capacity, but it wants to prepare better for further visitors. The village's most significant issue was caused by tourists who overcrowded the village, so the village is currently looking for a solution to build a parking lot outside the village to visit other attractions in this area.

The municipal office did not keep accurate records of income from the collected parking tax, nor does the accommodation tax provide accurate data. As a result, the municipality could not help us discover the exact effects of installing an artistic attraction because they do not know what financial effects this attraction caused. Based on our efforts to get information from

community officials, we can say that the local attractions could have a positive impact on local entrepreneurs in the form of increased visits, earnings, development, even expanded capacity, or added services in the village, such as “ice cream stall”. Nevertheless, they say that, overall, this activity could have harmed the community. The concentration of tourism bothered the locals in particular, who could not park comfortably in the village center during the weekend when shopping, but especially the inhabitants of one street, the one with the access street to the attraction.

Based on the obtained data and interviews with local government representatives, we created an estimate of the total number of visitors to the village during the art installation.

Graph 1 Estimated number of visitors in a village with an artistic installation while being present



Source: own research

However, the estimated quantitative expression of traffic fails to provide exact information about the impacts of this attraction, so we consider it necessary to know local businesses, residents, and opinion leaders' attitudes.

The local community is more important for tourism development than it may seem

The village of Súľov-Hradná is also relatively small concerning the conditions of the Slovak Republic. Approximately 950 people live here, but the negative experiences of about 10% of the village population were able to cause the earlier disassembly of the pyramid. The attendance of more than 30,000 people a year, concentrated mainly during the weekends of the summer tourist season, brought an increase in tourists, whose movement was concentrated mainly from the village center, where they parked, using one unsuitable street for the traffic aspect, to the meadow above the village. In-depth interviews were conducted with the village inhabitants to find out more accurate information.

Citizen 1 – living in the street, accessing the attraction

Citizen 1, living on the main access route to the former attraction, says he is glad that the Súľov pyramid was disassembled because thousands of people walked around his house every day, checked on him in the yard, violated his privacy and violated road traffic bans. However, he also admits that this attraction could be beneficial for tourism in the village. However, he says that it is necessary to deal with traffic differently and consider the protected area, such as parking outside the village. He also says that the municipality could have done more to eliminate negative externalities.

Citizen 2 –Entrepreneur in gastronomy in the village

The negative impacts were not an issue of the pyramid but insufficient infrastructure; the citizen directly proposed constructing a parking lot and a shuttle service to the municipality's management. According to her, the failure of the management to resolve the situation led to the current situation. The entrepreneur says that this attraction helped her business a lot, as well as her competition. She says that such an attraction had great potential, which was not exploited, but if it was, it could help, for example, kick-start the local economy and

mitigate the adverse effects of the Coronavirus pandemic. Citizen 2 states that the municipality, even if it did not take measures to eliminate the adverse effects of infrastructure, either due to its incapacity or for other objective reasons, could, for example, proceed to tax relief for the citizens as a form of compensation. Citizen 2 believes that Instagram tourism, which included this attraction due to its ability to promote itself through photos of people on social networks, represents a significant opportunity and support for tourism entrepreneurs within local tourism. However, it is necessary to think in advance about the effects of such an activity.

Citizen 3 - Entrepreneur in agriculture

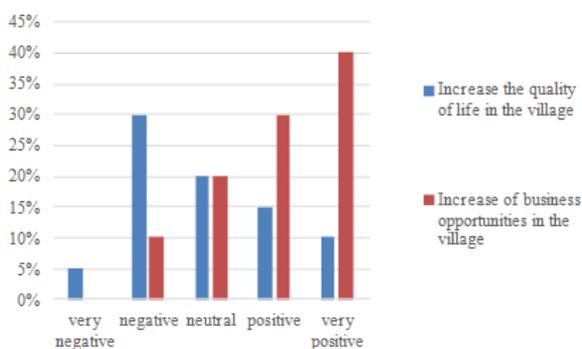
He says that their municipality could benefit the most from all sectors of the national economy from tourism, as the municipality has a substantial natural potential within this field. The citizen says that he is disappointed with the development of tourism support in the village. In his opinion, the village could build public services and goods and educate citizens on how to cope with the opportunity offered by this attraction. The citizen says that even strangers often parked in front of his house, but it was a source of money to the village, and it is a missed opportunity. Citizen 3 regrets that the best solution to the village's problems was to get rid of the „issue“ by disassembling the tourist attraction. The citizen expects that his business will also be affected by the attraction disassembly, but he expects the municipality to attract tourists in other ways, such as repairing hiking trails.

Impacts of an artistic installation on the options of business related to tourism

To obtain exact information, quantitative research was carried out on a sample of 27 business subjects. Through this sample, including all subjects in the municipality providing gastronomic services, accommodation services in the municipality, as well as entities performing activities within the retail, we get the data of deterministic nature based on a comprehensive range sample of the statistical survey.

During the statistical research phase, respondents were asked several primary and control questions, finding out their opinions and attitudes regarding the impacts of the village's visual pyramid. Based on several questions, we found that the subjects performing business activities felt the positive impact of the art installation, but the subjects themselves also felt the adverse effects, as they act as entrepreneurs in the village and as residents. Graph 2 shows the percentage of answers to the question concerning the increase in business opportunities and quality of life resulting from the installation of a work of art/attraction. The results show that most business entities felt the positive effects of an artwork installation, but at the same time, felt the adverse effects on the quality of life in the village.

Graph 2 Estimated visits at a village with an art installation while present



Source: own research

Based on another question asked to the respondents, only 52% of the respondents believe that the art installation contributed to the

municipality's economic development, but on the contrary, 48% of them think that it did not contribute. This indifference in the opinion suggests that the negative externalities of positive impacts on tourism are also reflected in businesses' opinion on the contribution of the art installation to the economic development of the municipality.

Considering another question, 62% of respondents said that the municipality's proper steps could eliminate the adverse effects of tourism development in the village and only 14% of respondents were of the opposite opinion; the remaining share did not want to comment on the steps of the municipality.

When asked about the possibilities and needs to keep the visitor in the village for more than one day by creating other values that could attract visitors, 40% of respondents said that it was not necessary to keep the visitor longer during the primary tourist season because they had their total capacity completely overloaded. 20% percent of them stated that keeping the customer longer is the competence of the municipality, 20% of the respondents said that such opportunities did not arise. In retrospect, they realize that they should have worked on it in the past to build other attractions in the municipality and 20 % of respondents state that certain activities initiated by citizens or local entrepreneurs were present.

Through their answers, local entrepreneurs also provided a clear picture of their views on their business's possible economic development by building similar attractions connecting art and culture. 87% of respondents stated that attractions similar to the Súl'ov pyramid, if adequately managed, can have a positive effect as a complement to other tourist attractions such as cultural or natural heritage. This heritage can contribute to significant economic development in their surrounding area. Most respondents also agreed that they would be willing to enter into a transparent partnership with other subjects in their vicinity, such as entrepreneurs, the municipality or local tourism organization or local activists, and to participate in building a tourist attraction or suitable infrastructure such as parking, also to contribute financially.

Regarding the specific impacts of the installation of an artistic attraction on the marketing activities of the respondents, 82% of them said that they spent the same amount on promotion, but with a higher profit, 18% of respondents spent less on promotion as much as in the period before the installation of the work of art. Within closed question with choosing from several options, 87% of respondents stated that their customers learned about the location in which they work and its offer through nice photos of other people on social networks, 13% of the remaining respondents stated that their customers learned about the location and its offer from nice photos of other people on social networks shared in various groups and social networking sites of local tourism organizations. This aspect may indicate an essential link between the aesthetics and photogenicity of the attraction and its ability to propagate organically.

Based on the chi-square test, we did not reveal any dependence between the type of facility and the strength of business success caused by building an art installation, so we can say that this initiative helped every business in the village and its surroundings.

6 Discussion

Art, culture and aesthetics are even more critical in social networks in the tourism environment than ever before. The examples presented in this paper illustrate the number of individual initiatives that were able to raise the profile of a particular site and attract capital to the sites in increased traffic. The given examples are interesting not only by their appearance but especially by their motivations or story. They show that communities can voluntarily have the desire to uplift their surroundings and entrepreneurs who, following the Keynesian economy, can enrich the community around them. We should not forget the aesthetic experiences through which these

attractions can bring new elements and values to their surroundings and the additional development when proactive individuals can seize opportunities and perceive the attraction of tourism as an essential product that seeks to expand. This paper took the unique opportunity to map the course and impact of installing a work of art, which became an attraction of tourism in the particular period. The data obtained through qualitative and quantitative surveys presented in this work suggest that art as an attraction of tourism can, without any additional promotion, increase the total annual traffic of one site by at least 250% over 5 years compared to the period before its construction. However, as our findings show, it is essential to create a tourism attraction, but the creators of future attractions should also focus on aligning the aspects of the new attraction with the local community and sustainable tourism principles, because the community does not have to take the initiative positively, as was the case of this particular “unsustainable” attraction. It is essential to think that similar activities should enrich the whole community, not just individuals, so inappropriate infrastructure or management not thinking about the needs of different groups can ruin such an activity's success. The example of the Súl'ov Pyramid showed that the management of the solitary attraction of tourism, at first sight, is crucial and the estimation of its possible future impacts is all the more critical. As locals said, “the first two years we did not observe anything, the last two years we could not stand it anymore.” However, we are still of the opinion that even before the disassembly of the attraction as the best solution, monetary regulation could be raised, for example by increased parking fees in attractive periods of the high number of visitors and especially by rational management of achieved revenues to enable more efficient management of attraction management.

Last but not least, it turns out that it is necessary to build a culture of tourists to be considerate of the locals and surrounding area. It seems that tourism must be adopted mostly by local people. The market balances demand and supply for accommodation, but the infrastructure must be built by the local government, which is essentially a local population and citizens.

7 Conclusion

This paper deals with art as a possible tool suitable for identification of the right solution to sustainable tourism; therefore, this paper provides not only a theoretical search of fundamental principles but also presents good examples from the tourism practice in which art has become a product, but also a communication tool. These examples are more than just inspiration for effectively combining art with tourism. However, they describe the various forms of such activity that can be initiated by the local municipality, citizens, and entrepreneurs of local communities in a cycle that they can benefit from. The analytical part of the paper evaluates the effects of installing a work of art on local development. It turns out that local peoples may be a more important factor for successful development within the tourism development than is explicitly visible. Based on our findings, there is a need to think in advance about the possible negative externalities that the development of the site may bring to the stakeholders and prepare for the need to eliminate these future externalities. The analysis of a specific case of the penetration of art and tourism confirmed the high potential of development through “Instagram” tourism by incorporating art into the tourism complexity. The ability to increase traffic and develop business opportunities has been proven. However, the example of rocket development of tourism also pointed to the need for quality site management and visions and strategies. It should consider the local population's values because otherwise, tourism development may not be aligned with what the local population finds appropriate. Therefore also art can become an instrument of unsustainable development.

Literature:

1. Alam, M. S., & Paramati, S. R.: The impact of tourism on income inequality in developing economies: Does Kuznets curve

- hypothesis exist? In *Annals of Tourism Research*, 2016. 61, pp 111–126.
2. Anatasia, V.: The causal relationship between GDP, exports, energy consumption, and CO₂ in Thailand and Malaysia. In *International Journal of Economic Perspectives*, 2015. 9, pp 37–42.
3. Bec, A., McLennan, C., & Moyle, B.: Community resilience to long-term tourism decline and rejuvenation: A literature review and conceptual model. In *Current Issues in Tourism*, 2016. 19 (5), pp 431–457.
4. Bec, A., Moyle, B., & Moyle, C. L.: Resilient and sustainable communities. In *Sustainability*, 2018. 10 (12), pp 48–50.
5. Bramwell, B.: Opening up new spaces in the sustainable tourism debate. In *Tourism Recreation Research*, 2017. 32 (1), pp 1–9.
6. Bramwell, B., & Lane, B.: Towards innovation in sustainable tourism research? In *Journal of Sustainable Tourism*, 2012. 20 (1), pp 1–7.
7. Carballo, F. R.: Tourist experience, image, security and cultural centres. Doctoral dissertation summary. In *European Journal of Tourism Research*, 2015. 11, pp 189–193.
8. Darázs, T., & Šalgovičová, J.: Impact of the corona crisis on marketing communication focused on tourism. In *Communication Today*, 2021. 12(1), pp 148–161.
9. Dolnicar, S., & Ring, A.: Tourism marketing research: Past, present and future. In *Annals of Tourism Research*, 2014. 47, pp 31–47.
10. Estevão, C., Garcia, A. R., Filipe, S. B., & Muniz, A. C.: Convergence in tourism management research: A bibliometric analysis. In *Tourism & Management Studies*, 2017. 13 (4), pp 30–42.
11. Fodness, D.: The problematic nature of sustainable tourism: Some implications for planners and managers. In *Current Issues in Tourism*, 2017. 20 (16), pp 1671–1683.
12. Font, X., & McCabe, S.: Sustainability and marketing in tourism: Its contexts, paradoxes, approaches, challenges and potential. In *Journal of Sustainable Tourism*, 2017. 25(7), pp 869–883.
13. Gössling, S.: Tourism, information technologies and sustainability: An exploratory review. In *Journal of Sustainable Tourism*, 2017. 13(2), pp 1–18.
14. Hall, C. M.: *Tourism and social marketing*. London: Routledge, 2014. pp 289. ISBN 978-0-415-57665-9.
15. Jarábková, J., & Hamada, M.: Creativity and rural tourism. In *Creative and Knowledge Society*, 2012. 2(2), pp 5–15.
16. Jones, P., Clarke-Hill, C., Comfort, D., & Hillier, D.: *Marketing and sustainability*. In *Marketing Intelligence & Planning*, 2008. 26(2), 123–130.
17. Li, H., Chen, J. L., Li, G., & Goh, C.: Tourism and regional income inequality: Evidence from China. In *Annals of Tourism Research*, 2016. 58, pp 81–99.
18. McCartney, G., Butler, R., & Bennett, M.: A strategic use of the communication mix in the destination image-formation process. In *Journal of Travel Research*, 2008. 47(2), pp 183–196.
19. Richards, G., & Marques, L.: Exploring creative tourism: Editors introduction. In *Journal of Tourism Consumption and Practice*, 2012. 4(2), pp 1–11.
20. Žaloudek, K.: *Encyklopedie politiky*. Libri, 1996. 1. Vyd., pp 511. ISBN 80-85983-11-7.

Primary Paper Section: A

Secondary Paper Section: AL

POSITIONAL EMPHASIS IN THE MODERN LITERARY TEXT

^aSVITLANA HALAUR, ^bRUSLANA SHRAMKO,
^cSVITLANA PEDCHENKO

^aNational University "Yuri Kondratyuk Poltava Polytechnic",
24 Pershotravnevyi Ave., Poltava, Ukraine, 36011

^bPoltava V. G. Korolenko National Pedagogical University,
2 Ostrohradskiyi St., Poltava, Ukraine, 36000

^cPoltava V. G. Korolenko National Pedagogical University,
2 Ostrohradskiyi St., Poltava, Ukraine, 36000

email: ^asvitlana.galaur@gmail.com,

^bshramenlatk02006@gmail.com, ^csvpedchenko@gmail.com

Abstract: The given article touches upon one of the most relevant in modern psycholinguistics problems of literary cognition of reality by the addresser and perception of his knowledge by the addressee. A positional emphasis has therefore been analysed as a productive way of regulating the reader's perception of the text information. The research focuses on the relevant exposure of all the traits of lingual units' actualization and on the further sustainable in-depth description of its linguistic techniques. The investigation grounds on up-to-date methods of literary texts' analysis, particularly on lingual-poetic interpretation, regulatory structuring as well as on information-content one. The psycholinguistic experiment and the survey likewise the method of gradual scaling as its constituents revealed their productivity.

Keywords: positional emphasis, regulatory technique, stylistic technique, text regulating.

1 Introduction

The topicality of the research. Up-to-date psycholinguistics comprehends a large array of issues of the text perception, in terms of which the proper linguistic approach of the solution disclosed its inefficiency. Having been provided by the facts of interaction of mental and lingual mechanisms generating/decoding information, this scientific branch appeals to lingual consciousness within the text scilicet the inner process of programming and regulating the outer activity via lingual tools. In these terms, the high priority of the regulation theory of the literary text for diverse psycholinguistic research is irrefutable. Primarily, it targets to capture lingual stimuli of the cognitive activity of an addressee, who projects the directly expressed content onto the deep layers of the literary work, going from the perception of the text to its understanding. Likewise, the regulation theory approach makes a framework to all-embracing analysis of the regulatory means' ways of organization in the text and the design of regulatory microstructures, thus, to decipherment of the unfolding of the text aesthetic content.

Problem stating and analysis of previous studies. Actualisation represents the universal way of drawing reader's attention to the textual units, significant from communicative point of view. The mentioned above lingual phenomenon is traditionally found in the focus of philologists' studies, being interpreted on the base of various theories, they are, particularly, the theory of tension (V. Shklovskiy), advancement (representatives of Prague Linguistic Circle, and I. Arnol'd), dominants (V. Kukharenko), profiling (R. Langacker), deviation from the norm (I. Arnol'd). Quite a while the actualisation appeared to be identical to the expressiveness of language, the latter led to symbiosis of some linguistic concepts, videlicet expressive actualisation, expressive means of image-emotional actualisation, etc. It is worth mentioning that the actualisation and the expressiveness of textual units tend to be interrelated, though not interchangeable terms. Their effective usage secures the successive performance of the characteristics of miscellaneous categorical groups, namely regulation and expressiveness, in the text. As an aesthetic category, expressiveness incorporates evaluation and emotionality. Generated by different tropes and figures, the expressiveness emerges in those places of the text, where one can see a stylistic request for it and actualise the necessary content by means of regulation, according to author's intention. The expressiveness underlies the regulation, which utilizes aesthetic categories to highlight crucial content constituents of the multiplex information system of literary text.

The purpose of the research appears to elicit peculiarities of lingual units' actualisation via regulation means of positional emphasis and to provide the further in-depth analysis of its linguistic techniques. In order to fulfil the above-mentioned goals, it is essential to expose all conceivable macro-/microcontext varieties of positional emphasis in literary texts of the present-day Ukrainian prose, likewise to differentiate regulatory and stylistic devices.

2 Materials and Methods

The given article has its base on the contemporary methods of the literary texts' analysis scilicet lingual-poetic interpretation, providing exposition of the content on the background of system-semantic relations of multileveled language units, regulatory structuring, aiming the observation on regulators as stimulants of various communicative effects, and information-content, focusing on the analysis of semantic development of the text. In addition, the psycholinguistic experiment, particularly the survey and the method of gradual scaling, opened to be productive. The respondents were students-philologists (100 persons in total).

3 Results and Discussions

The law of Hermann Ebbinghaus, German psychologist who pioneered the investigation of the rule of "borderline" (Ebbinghaus, 2011), successfully proved in numerous experimental studies, declares, "the beginning and the end of any information series are stored in human memory better than its middle part" (Roeskelein, 2006, 548). This statement particularly retains the function of the ground to the positional emphasis regulatory way as the promotion of text elements in "strong positions" (Arnol'd, 1978, 24). In consequence, given technique makes strong hierarchy of the content constituents, establishing the further links between adjacent/distant single-levelled/multileveled text elements and simultaneously empowering the aesthetic perception of the artistic message.

In fact, the positional emphasis techniques have routinely been opted at both macro- and microcontext levels. The macrocontext techniques of the positional emphasis are relevant for obligatory (around-text and text) as well as optional (around-text) elements.

Usually the title complex obtains the strong text position, unveiling the traits of a medium in the addresser-addressee code; also it determines "the horizon" of readers' expectations. Perception and understanding of any literary work make their root in the title. Such spatial adjacency between the text (before and above it) and the title allows the interpretation of the latter, by the classification of Charles Peirce, as an index sign, "correlating with its semiotic object via some actual or physical or imaginary causal link" (Merrell, 2005, 31). The usage of the title also represents a writer's ploy according to the fact this text unit condenses the entire text, revealing its significant prospective-pragmatic potential. In addition, the reflexive activity of the recipient contributes the beneficitation of the title with additional denotative-connotative content, subsequently evolving from nominative to figurative one. A striking example of the kind can be exposed by a simple-structured (noun phrase) verbal-thematic title of a story "The Snows of Amalienborg" by Valentyna Vzdulska (2017), manifesting the following narration about Copenhagen palace complex as winter residence of the Danish royal family. Thorough perusal gradually unmasks the metaphorical and symbolic meaning of the title, while the text covers the story of Pavlo Vityuk, an elderly churchwarden, who addresses the Danish Queen Margrethe II, pleading for donation of some funds to the orphanage. In this case, *Amalienborg*, a proper name that is, gets a strong association with the world's beau monde therefore the author integrates it to the semantic group as follows: *Мій дід написав багато таких листів нашим депутатам, телезіркам і дружинам президентів. Але вони не відгукнулися. Тоді він почав писати за кордон*

різним знаменитостям і просити в них допомоги для українських сиріт. Якось він написав навіть Маргарет Темчер, коли та ще була жива [My grandfather has written plenty of letters of the kind to our deputies, TV-stars, and wives of presidents. Although they have not answered in return. Then he started writing abroad addressing various celebrities seeking help to Ukrainian orphans. Somehow, he wrote even to Margaret Thatcher, when she was still alive]. Given title contains the keyword snows, which duplicates within the text canvas, overgrows with epithets, metaphors, and comparisons: Стоїть на притушеній снігом площі в Амалієнборзі й визирає Маргрете у згаслих вікнах палацу [There stands Margrethe on the snow-covered square of Amalienborg or peers out of the extinguished windows of the palace]; Щось там змінилося – застигло, знерухоміло, скуте мінус тридцятьма цілковитої безнадії [Something changed there, having been frozen, motionless, bound by 30 degrees Celsius of total despair]; У тебе всередині щось перевертається й рухає, як кучугура свіжонаметеного снігу [You have something deep in your soul, rolling over and squeaking like a clump of freshly fallen snow]. Likewise, these structures become constituents of the expanded antithesis cold – warm: *Одного січневого вечора, вже після свят, ти повертаєшся з танців повз “Корицю”*. [...] *Наспівуючи, ти кидаєш погляд у тепле золотисте нутро кав’ярні [Once in a January evening, when all the holidays are through, you come back from dance party along the “Cinnamon”*. [...] *Сантиляючи, ти поглядаєш в тепле золотисте внутрішнє кафе*]. At the end of the story, this antithesis gets vivid explication, when the writer represents the whole picture from a diametrically opposite point of view, according to the principle of “pointe shoes” as follows: *Ти сподіваєшся, що це буде весна або літо. Сніги Амалієнборгу вже розтануть. Небо з сірого стане блакитним, трава – зазеленіє, на клумбах цвітнуть тюльпани або троянди. А коли ти повернешся, то, може, навіть напишеш декому. І, може, навіть запросиш його в кіно. А потім – у “Корицю”. Тільки не на гарячий шоколад, а на холодний-холодний молочний коктейль, бо ж буде вже тепло [You do hope it is to be spring or summer. The snows of Amalienborg will have already melt. The sky full of grey turns into blue, the grass becomes emerald-green; there are tulips and roses flourishing in the flowerbeds. Later, when you are back again, probably you will write to someone. Maybe you even invite to the movies. Then – to the “Cinnamon”. It is not actually about the hot chocolate, but the so cold milk shake, for it will be warm then].* The ending of this kind meaningfully reflects the contents of the title, that is the author’s desire to melt down the cold apathy of people. Particularly not only of these who got rid of the ability to empathize due to huge material wealth, but also of those who make the meaningless communication via Internet the higher priority over the useful deed. Thus, the title ascertains the theme of the text in a concise form, enlightening the core plotline of the work and elucidating the semantic and conceptual information, revealed on the background of the whole novel.

Apart of the latter, subheadings, epigraphs, and dedications as other, optional, constituents of the title complex reveal their vivid segmentation. The subheading typically adjusts the perception of the text within all the primarily ascertained genre parameters, corrected by the author: *Потерчата. Дитяча сповідь для дорослих, які так нічому й не навчилися [Poterchata. Children’s confession for adults, who learned nothing in life]* (Rutkivskyi, 2013); *Нянька-Ненька. Зі щоденника заробітчани [Nanny-Mummy. An excerpt from the woman-employee’s diary]* (Drachkovska, 2009); *Грози над Туровцем: Родинні хроніки [Thunderstorms over Turovets. Family chronicles]* (Danylenko, 2014); *Денеж Мод. Ще одна розмова [Depeche Mode. One more talk]* (Zhadan, 2015). In fact, this part of the text endures the further subdivision into nominative and nominative-stylistic types, where the unification of the second one and the title itself results in double title of the novel, rational and emotional at the same time.

Another significant unit of the text, an epigraph, discloses its profound structure level, simultaneously explicating the author’s idea and launching the storyline. An outstanding Ukrainian

insurgent song “*Буде нам з тобою що згадаємо... [We’ll have much to remember then...]*” makes a vivid example of such a component; specific lines of the song constitute an epigraph to some parts of the novel “*Marusia*” by Vasyl Shkliar (2014), eventually manifesting a close connection with the beginning of the narration. It is worth mentioning that epigraphs have a potential to establish straightforward relationships with a reader and provide an appropriate perception of the text, they attach the addressee to the intertextual dialogue. Up-to-date fiction represents the usage of various in volume epigraphs. In fact, excerpts from poetic and prose texts of the World and Ukrainian literature as well as the Bible occupy a dominant position. Concerning the problem of an epigraph perception, we should expect the reader not to neglect or pay lesser attention to the mentioned above emphasised text unit. Those psychologists (Valentyn Asmus, Lev Vyhotskyi, Lidiia Zhabytska, Borys Korman, Olha Nikiforova, Pavlo Yakobson), who deal with readers’ activity issue, highlight the fact that ignoring epigraphs consequently results in the incomplete perception of the given text.

Composing a literary text, the writer also bears in mind creative aptitude of the reader to decipher inscriptions. The importance of the latter for the reader was tested by the scale method on the base of the M. Dziuba’s (2003) novel “*Covered by the sky*” and its inscription. All the respondents were asked to create the subjective space of the citation perception with a help of the scale from 1 to 5 as follows: *The novel “Covered by the sky” by M. Dziuba has an inscription “Моїм дорогим країнам присвячую. Будьмо! [Dedicated to my dearest compatriots. Let us live!]”. Reveal the position, by which it ultimately helps you to make an adequate interpretation of the content of the text. Evaluate your own answer on the 1-5 scale. Results are represented in the Tab. 1:*

Tab. 1: Functions of Inscriptions

№	Function	1	2	3	4	5
1	illuminates the culturological component of the content					
2	makes the reason for author’s sympathies					
3	ascertains the depth of author’s emotions					
4	determines the role of the author as medium between the text and the reader					
5	forms an indication for understanding of author’s intention					
6	provides the author with personal connection to the reader, opens the possibility to address the reader directly					
7	uncovers the title of the novel					

Source: own questionnaire designed specifically for the research.

The results of the experiment manifest that inscription 1) is closely attached to the text by diverse emotional relations (the position was given the highest mark by 90% of respondents), 2) much more distinctively discloses the whole text to the reader (80%), 3) assuredly, represents a clue to comprehension (70%).

In modern literary texts, inscriptions predominantly have an anthroponomical “gift inscriptions” pattern: *Крістіанінові, Соломії та Іншим [To Christianine, Solomiia and Others]* (Andrukhovych, 2013); *Мояму батькові [To my Father]* (But, 2015); *Любомирові Шкоруті, котрий викупив мене з неволі [To Liubomyr Shkoruta, who redeemed me from the captivity]* (Shkliar, 2013). On the one hand, they generate an intimate “aura” around the text, functioning as a text amulet and exposing author’s personal memory, on the other hand, they mark specific transition node in the poetic-autobiographical hypertext of the writer. According to the representation mode of the addressee, personal individual inscriptions obtain leading status.

Inscriptions-dedications unveil author's intention: *Мосму Кривому Роду, що тягнеться живим ланцюгом із гір і лісів і тече рікою Любові через світи й віки [To my bloodline, stretching like living chain from mountains and forests, flowing like river of Love through the worlds and centuries]* (Dochynets, 2013); *Присвячується моїй бабці Олі та дідусяві Івану-Михайлу Гурницьким. Їхнє життя було непростим, доля складною, а кохання трагічним, проте вони завжди залишилися для мене зразком інтелігентності, вишуканості та культури, притаманних довоєнному Львову [Dedicated to my grannies Olya and Ivan-Mikhailo Hurnytski. Their life was not easy, their fate was intricate, and Love was tragic; nevertheless, they always have been an example of culture, elegance and standard, inherent in pre-war Lviv]* (Hurnytska, 2017). Inscriptions-gratitudes have the same capacity: *Ця книжка з'явилась завдяки Андрієві і Мар'яні, які поруч у всі миті, моїм батькам, які назавжди зарядили мене підтримкою, Ренаті Середницькій, яка прихистила і зігріла у своєму затишному домі, Жанні Комар, яка підказала стежку до основного джерела, Дані Винницькій, музика якої напуває силами і натхненням, Богдані Матіяш, яка подарувала хрестик, а також всім іншим людям та обставинам, мені подарованим [This book appeared thanks to Andrii and Mariana, who are near in all the moments of my life, thanks to my parents, empowering me with a support; thanks to Renata Serednytska, who gave me shelter and warmth in her cozy house; thanks to Zhanna Komar, who prompted me with a path to the main source; thanks to Dania Vynnytska, the music of whom gives life power and inspiration; thanks to Bohdana Matiash, who gifted me a cross; also thanks to other people and circumstances, been given to me]* (Andruchovych, 2015). Primarily, all these dedications undergo the subdivision into individual and collective due to the way of addressee performance.

Despite of dissimilar, narrative and discourse, approaches, regulating the interpretation of the beginning and the end of the text, many researches (Iryna Arnol'd, Yuliia Bohatova, Nataliia Bulaieva, Bernhard Korte, Constanze Krings, Kateryna Moskalova, Iryna Stoliarova, Hans-Wilhelm Schwarsze, etc.) came to the point these two positions have a particular importance to the reader. That is, events are perceived based on information, already acquired at the beginning, whilst the end of the text frames their holistic decoding. Usually, the very beginning of the narration has a strong association with the beginning of text events (Schwarsze, 1982), whereas its end is stated by the last passage (Bonheim, 1982, 117), particularly the fragment to disclose the winding up, to manifest the new knowledge, to change velocity and modus of the narration, etc. (Krings, 2003).

No less important are author's preface or prologue – an information of the introductory pattern of the text, considered as rather independent fragments due to the content. However, they are deprived of their significance without the main text, while inside the text itself some information loses its intensity. In fact, prefaces get the reader acquainted with prototypes of characters, auxiliary materials, been used in the main text composition. It is noteworthy that the text constituents hold author's stance towards the depicted future developments. In the preface of her novel "Closed circuit" the author Svitlana Talan (2017), particularly, quite unequivocally settles the angle of the readers' approximate perception via an older soothsayer's aphorisms as follows: *Кожен кує свою долю [Everyone is a blacksmith of their own fate], Не будьте поборені злом, але перемагайте зло добротою [Do not be conquered by evil, but overcome evil with kindness], Зло знищує душі [Evil destroys souls], Треба любити ближнього свого, як самого себе [You should love your neighbour as yourself]; Що віддала – те й отримай, бо такий закон життя [You get what you give, that is law of life].* Mostly, prologues are asynchronous by temporal and spatial parameters with the main text, marking likewise prefaces a conceptual information and raising philosophic, moral and ethical issues that comprise the basis of the plotline of the text. Author's afterword or epilogue in their turn appear as specific text patterns to be inferred to; they function mainly to satisfy the

interest of those readers who endured narration events particularly emotionally and show great curiosity about the future fate of the characters.

Among the quite common phenomena of the comprehensive fiction, one should also mention the onyms', keywords' and intertextual inclusions' emphasis in diverse macrocontext strong positions, in particular the anthroponym Black Raven, used in the novel "The Remnant" by Vasyl Shklyar (2010), stands for reinterpretation of attributive-substantive collocation black raven, symbolizing wisdom by the Bible version. In such a case, this archetypal onym enlists the reader to some kind of fascinating game, the complexity level of which depends on presuppositional readiness for text perception, and meanwhile attaches them to cultural-semiotic worldview tandem with the author. It is woven into the regulatory microstructure of keywords like vanity over vanities, all is in vain, everything passes, everything is just spinning around and comes full circle, everything goes back to the way it was and there is no new thing under the sun on the base of semantic equivalence, provoking deep thoughts about an insignificance of human life. More than that, the keywords pragmatics reveals subordination to their contact or remote layout: the regulatory microstructure of the keywords' contact location (within the consecutive passages' boundaries) usually exposes author's emotional-evaluative response while the pattern of a remote (dispersed throughout the text) one directs reader's imagination and mind towards the process of reducing the general idea of the text. The latter formed the subject of thorough analysis of respondents as follows: *At the very beginning of the novel "The Last Notch" by Tetiana Pyshniuk (2016) readers can come across the collocation red apple, duplicated then for several times within the excerpt. What information, in your opinion, does this repetition highlight?*

- only charismatic personalities have to create a history;*
- we got used to colourless life, so that bright colours sometimes frighten us;*
- the fate of the prominent people is unlikely to be easy;*
- it is hard to identify the semantic load of the given unit on the background of such a small text fragment;*
- your own variant _____.*

To sum up, 10% of respondents chose a, 10% of them chose b, while 80% – chose c, and 0% of respondents to choose d and e.

Nowadays the microcontext techniques of positional emphasis have multifaceted nature and are intensely implied in the modern fiction. They arrange the text constituent updating in the beginning, in the end as well as in certain or unusual positions of the sentence. The spectrum of widely spread regulatory techniques today likewise accommodates identical structure of initial parts of adjoined sentences. Various syntactic commencements, particularly subject, predicate or circumstantial, determine adequate settings for the further reading of the text. Subject commencements, in fact, put forward items of description, while predicate ones make the depicted dynamic and variable and circumstantial patterns emphasise on the special time-space line as follows: *І махрова м'якість халата в жовті квіточки була незвично-лагідною, і дотик близьки, постеленої на канапі, був інший, ніжнійший, не такий, як вдома. Велюрова м'якість штучного леопарда під рукою, і світло втраженого нічника – сонце крізь льодяник – усе оберталось радістю та спокоєм. Кімната зникла в темряві, щойно натиснула на вимкач... [So then terry soft of a wrapper in yellow flowers seemed unusually gentle and the touch of linen, spread on the couch, was different, gentler, not like home. All of it – velvet softness of an artificial leopard coverlet under the arm, and the light of stained-glass night-lamp like sunlight through the sugar-candy – illuminated with joy and peace. The room disappeared in the darkness the very moment the switch was turned off]* (Vdovychenko, 2012); *Стрекочуть швацькі машинки, щільно припасовані в кілька рядів уздовж всього цеху в десятки робочих місць. Страчать деталі пальто і пережукуються між собою двочастково-швацьки [Sewing machines are tightly fitted in several lines along the entire shop*

for dozens of workplaces, chirping. Girls-seamstresses are calling one another, stitching coats' parts] (Lesia Stepovychka, 2012); *Восени сорокового року старшого Соломійчиного брата Тараса забрали до Червоної армії. За два тижні до того разом це з кількома загоренськими хлопцями його викликали в район – волость по-колишньому, по-царськи, по польськи – гміна, а може, й повіт ці повіят. Та титерка, як совети прийшли, все було по-новому, по-інакшому, іноді й не розбереш, що до чого [In the autumn of 1940 Taras, the older brother of Solomiia, was taken to the Red Army. Two weeks before the occurrence he and some guys from Zahoriany had been summoned to the district centre – the parish as it was once, in the times of tsar, gmina in Polish or formerly county. Nevertheless, right now, as Soviets came, everything seemed new, different, sometimes you hardly understand what is going on] (Lys, 2016).*

Marking an important component of the content tend to be sufficiently essential at the beginning of the sentence. Therefore, it is about the consummation of segmented structure with Nominative Case of Imagination as peculiar satellite of the next sentence, in fact, it is created properly for this purpose. The Nominative Case of Imagination actually regulates exclusive psychological tension, the mood of expectation, focusing on the theme, which duplicates in the neighbouring context, frequently with a help of personal or other kinds of pronouns. The repetition of the theme, some specific intonation, and positive / negative mode constitute the profound expression of the utterance as follows: *Ранкова пора у місті. Нестямно горять білі свічки каштанів, зоріють світлячки акацій, мов прощальний акорд травня, потужний і п'яний акорд. Життя триває, видозмінюючи реальність [An early morning in the city. Ecstatic lights of chestnut white candles, starlight of acacias, like farewell chord of May, powerful and heady chord. Life is going on, modifying the reality] (Dara Kornii, 2016); *Передова стаття! Я написав передову статтю до газети [The front-rank article! I have written a front-rank article for the newspaper] (Andrukhovych, 2012).* Concerning the regulatory potential of segmented structures with Nominative Case of Imagination, it is worth mentioning that they objectify philosophical reflections of the author, provoke the situation of core historical events' remembrances, and deepen the inner traits of characters.*

Such positional kinds of repetitions as anaphora, epiphora, anadiplosis, and epanode also illustrate the mentioned above law of Hermann Ebbinghaus. These powerful syntactic-stylistic speech inversions contribute to more intense conviction of text fragments, indicating balanced thoughts of the author. Generally, the content emphasis by positional repetitions may even become the predominant authorial technique, vigorously exemplified in the novella "I live with a monster" by Halyna Tarasiuk (1995), expressed right through by initial tautological components (for example, *І так, обнявшись, завмираємо. Двоє монстрів. Двоє нещасних самотніх калік. Двоє самогубців, пришитих одне до одного долею [And so, embracing, we swoon. Two monsters. Two unhappy lonely cripples. Two suicides, sewn to each other by the fate]*, final repetitions (*Він любить порядок. За це його поважаю. Коли головував – у селі був порядок. Тепер – нема. Хто що хоче, те й робить. Ніхто нікого не боїться. А треба, щоб народ боявся. Коли не Бога, то власті. Тоді буде толк. І порядок [He loves order. I respect him for that. There was an order in the village when he was a head of the collective farm, right now – an opposite. Everyone does what he wants. Nobody feels fear towards anyone. The folk have to fear. If it is not God, then it is authorities. Only then, it would be a sense and an order]*), the junction of the finite unit of the previous sentence and the initial unit of the following syntactic structure (*Я знаю: це він ласться. Він ласться навіть уві сні; Але – мовчу. Мовчу і терплю [I just know: he swears. He swears even sleeping, but – I keep silence. I keep silence and tolerate]*), moreover, by the chiasm, built on the base of such the junction (*На старість кожен має те, що заслужив. Ми теж заслужили те, що маєм [In old age everyone gets what he deserves. We really deserved what we have now]*).

As a rule, the reader's attention may be drawn by the object, which, unlike others, occupies a separate position. In such a case, we study the paragraph separation of the sentence or even the word as regulatory technique of positional emphasis as follows: *Бо дім – то не лише гніздо, а точка, з якої ти бачиш Всесвіт і звідки Всесвіт сприймає тебе [Because home is not just family nest, but the point you observe the Universe from, and the Universe perceives you as well] (Ponomarenko, 2016); *Час – дивна річ [Time is a strange thing] (Iren Rozdobudko, 2011).* It is well known that the dominant criterion of the paragraphs graphic division in the literary text – a thematic one – has gone levelled. Under these circumstances, the text content constituents' combining serves as a specific hint to the appropriate processing of intellectual and emotional information by the recipient, focusing on readers' empathy as well as on their "catharsis".*

Specific text position is an inherent trait of the text elements limited via parcelling. Created by the sentence breakdown, emphatically strengthened parcelates actualize information, which is crucial according to the author's intention, and help to avoid ambiguity. In the modern fiction, there are main and secondary parts of sentence, parcelling as follows: *Вік, знаєте. Порода. Досвід [It is an age, you know. The breed. The experience] (Matios, 2011); *Бачити я не міг. Чути теж [I could not see anything. Hear as well] (Chekh, 2007); *Ідучи, раптом зауважив, що досі не розплющив очей. Проте бачив усе в кімнаті досконало [While walking, he suddenly observed he had not still opened his eyes. Nevertheless, he could perfectly see every object in the room] (Irvanets, 2010); *Вона стуха посміхнулася. Ледь-ледь [She softly smiled. Just barely] (Lys, 2015).****

Whilst reading the text, readers get the landmark in content deciphering via the unusual position of text components. This fact makes a touchstone of a stylistic inversion, the technique that opens the further possibility to move the logical emphasis. In consequence, the inverted element acquires pragmatic connotation: *Про мою ворожбу з псами скоро дочулися господарі [Soon the hosts have heard about my divination with dogs] (Dochynets, 2012); *Від палисадника під Жориним будинком долинають пахоці – там мліють на сонці мальви, хрін з кропом і оранжево-багряне квіткове буїство, в різновидах якого Пашок розуміється слабо [A smell of a perfume reach over there from the front garden of Zhora's house – there are mallows, horseradish with dill, and orange-purple luxuriance grind in the sun, Pashok has a very little to do with its varieties] (Volvach, 2004).* Such a distinguishing word order, by S. Göpferich, correlates with a simultaneous transfer of the theme to the very end and the rheme – to the very beginning of the sentence structure. The researcher is profoundly convinced that the speaker satisfies the emphase of the message this way and concurrently highlights an intense informative value of the rheme (Göpferich, 2008, 85). This statement was sufficiently confirmed throughout the experiment, targeting in comparison of the original sentence with inversion and transformed sentence without it as follows: *The author applies the indirect words order in the sentences of the given text. Please, compare the original unit with inversion Аня чомусь не дуже впевнено про це думала [Anne was thinking about it somehow not quite confidently] and the transformed unit without inversion Аня думала про це чомусь не дуже впевнено [Somehow, Anne was thinking about it not quite confidently]. Do they differ in semantic nuances, in your opinion?**

- the content of both units is identical;
- Anne's uncertainty is expressed more vividly in the first unit;
- Anne's uncertainty is expressed more vividly in the second unit;
- other observations _____.

Almost 95% of respondents chose variant b. Thus, in modern fiction the communicative structure of diverse syntactic units, built on the base of inversion, irrefutably ascertains the fact the first-rank content is usually located in the postposition of the

sentence, though sometimes its beginning “extrapolates not necessarily new but especially relevant for the addressee information” (Blumenthal, 1987, 45). As a rule, the final constituent of the sentence produce an objective information, while the initial component is subjective, being connotative and dramatic as well.

4 Conclusions

The expressive-stylistic tools forms the fundamental of the regulatory macro- and microcontext techniques of positional emphasis in modern Ukrainian. These techniques open the further perspective to systematise particular – framework – regulatory microstructures in literary texts. There is a tight hierarchical relation between text units within such microstructures; the consecutive removal of the mentioned above text units may cause the loss of the structural integrity of the text and of its content as well.

Up-to-date positional emphasis represents one of the powerful ways of regulating the reader’s perception of the text information. Thus, the given research does not embrace all the possible aspects, but contributes to the problem of constructive dialogue formation between the author and the recipient, making the vector for its future in-depth investigation.

Acknowledgements

The given article has no special external financial support and is funded only by means of personal incomes of the authors.

Literature:

- Ebbinghaus, H.: *Über der gedächtnis. Untersuchungen zur experimentellen Psychologie* [About the memory. Research on experimental Psychology]. Darmstadt: WBG Academic, 2011. 128 p. ISBN 978-3-53424-012-8.
- Roeskelein, J.: *Elsevier’s dictionary of psychological theories*. Burlington: Elsevier, 2006. 692 p. ISBN 978-0-4445-1750-0.
- Arnol’d, I. V.: Znachenije sil’noy pozitsii dlya interpretatsii khudozhestvennogo teksta [The significance of the strong position for the interpretation of the literary text]. In: *Foreign Languages in School*. 1978. No. 4, pp. 23-31. ISSN 0130-6073.
- Merrell, F.: Charles Sanders Peirce’s concept of the sign. In: *The Routledge Companion to Semiotics and Linguistics*. London and New York: Taylor & Francis e-Library, 2005, pp. 28-39. ISBN 0-41524-313-0.
- Vzdulska, V.: Snihy Amalienenborhu [The Snows of Amalienborg]. In: *Chat dlia divchat* [Chat for girls]. Lviv: Vydavnytstvo Staroho Leva, 2017, pp. 45-56. ISBN 978-617-679-286-4.
- Rutkivskiy, V.: *Poterchata. Dytiacha spovid dlia doroslykh, yakii tak nichomu y ne navchylisia* [Poterchata. Children’s confession for adults, who learned nothing in life]. Ternopil: Navchalna knyha – Bohdan, 2013. 256 p. ISBN 978-966-10-3146-2.
- Drachkovska, O.: *Nianka-Nenka (zi shchodennyka zarobitchanky)* [Nanny-Mummy. An excerpt from the woman-employee’s diary]. Lviv: Kalvariia, 2009. 192 p. ISBN 978-966-663-265-7.
- Danylenko, V.: *Hrozy nad Turovtsem: Rodynni khroniky* [Thunderstorms over Turovets. Family chronicles]. Lviv: Literaturna ahentsiia «Piramida», 2014. 370 p. ISBN 978-966-441-347-0.
- Zhadan, S.: *Depesh Mod. Shche odna rozmova* [Depeche Mode. One more talk]. Kharkiv: Klub simeinoho dozvillia, 2015. 240 p. ISBN 978-966-14-9096-2.
- Shkliar, V.: *Marusia* [Marusia]. Kharkiv: Klub simeinoho dozvillia, 2014. 320 p. ISBN 978-966-14-7838-0.
- Dziuba, M.: *Ukryti nebon* [Covered by the sky]. Ivano-Frankivsk: Tipovit, 2003. 240 p. ISBN 966-8098-06-5.
- Andruchovych, Y.: *Dvanadtsiat obruchiv* [Twelve hoops]. Kharkiv: Klub simeinoho dozvillia, 2013. 288 p. ISBN 978-966-14-4812-3.
- But, S.: *Lysty z toho svitu* [Letters from the netherworld]. Kharkiv: Klub simeinoho dozvillia, 2015. 300 p. ISBN 978-966-14-8331-5.
- Shkliar, V.: *Elemental* [Elemental]. Kharkiv: Klub simeinoho dozvillia, 2013. 224 p. ISBN 978-966-14-4815-4.
- Dochynets, M.: *Horianyn. Vody Hospodnikh rusel* [Highlander. Waters of Lord’s channels]. Mukachevo: Karpatska vezha, 2013. 311 p. ISBN 978-966-8269-36-3.
- Hurnytska, N.: *Melodiia kavy v tonalnosti spodivannia* [The coffee tune in the mode of hope]. Kharkiv: Klub simeinoho dozvillia, 2017. 256 p. ISBN 978-617-12-2260-1.
- Andruchovych, S.: *Feliks Avstriia* [Felix Austria]. Lviv: Vydavnytstvo Staroho Leva, 2015. 280 p. ISBN 978-617-679-082-2.
- Schwarze, H.-W.: Ereignisse, Zeit und Raum, Sprechsituationen in narrative Texten [Events, time and space, speech situations in narrative texts]. In: Ludwig H.-W. *Arbeitsbuch Romananalyse* [Workbook of novel analysis]. Tübingen: Narr, 1982. 260 p., pp. 145-188. ISBN 978-3-87808-932-2.
- Bonheim, H.: *The Narrative Modes. Techniques of the Short Story*. Cambridge: Totowa, NJ by D. S. Brewer, 1982. 197 p. ISBN 0-85991-086-5.
- Krings, C.: *Zur Typologie des Erzählschlusses in der englischsprachigen Kurzgeschichte* [The typology of the narrative in the English-language short story]. Frankfurt-Berlin: Peter Lang, 2003. 206 p. ISBN 978-3-63150-356-0.
- Talan, S.: *Zamknene kolo* [Closed circuit]. Kharkiv: Klub simeinoho dozvillia, 2017. 320 p. ISBN 978-617-12-2273-1.
- Shkliar, V.: *Zalyshenets* [The Remnant]. Kharkiv: Klub simeinoho dozvillia, 2010. 384 p. ISBN 978-966-14-0662-8.
- Pyshniuk, T.: *Ostannia zarubka: uryvky z romanu* [The Last Notch: excerpts from the novel]. Slovo prosvity [The Word of Education]. 2016. No. 34 (August 25-31), pp. 8-9.
- Vdovychenko, H.: *Kupalnytsia* [The Bather]. Kharkiv: Klub simeinoho dozvillia, 2012. 240 p. ISBN 978-966-14-4230-5.
- Stepovychka, Lesia: *Myr, druzhba, zhvachka, abo kontrakt z tovaryshem Lunacharskym* [Peace, friendship, chewing gum or the agreement with comrade Lunacharskyi]. Nimtsi v horodi [Germans in the city]. Vol. 1. Dnipropetrovsk, 2012. 406 p., pp. 11-186. ISBN 978-966-383-388-0.
- Lys, V.: *Solo dlia Solomii* [Solo for Solomiia]. Kharkiv: Klub simeinoho dozvillia, 2016. 363 p. ISBN 978-966-14-5688-3.
- Kornii, Dara: *Honykhmarnyk* [The Cloud-Driver]. Kharkiv: Klub simeinoho dozvillia, 2016. 332 p. ISBN 978-966-14-1009-0.
- Andruchovych, Y.: *Taiemnytsia. Zamist romanu* [A Mystery. Instead of the novel]. Kharkiv: Folio, 2012. 480 p. ISBN 978-966-03-4392-4.
- Tarasiuk, H.: *Ya zhyvu z monstroom* [I live with a monster]. Liubov i hrikk Marii Mahdalyny [The love and the sin of Mariia Mahdalyna]. Chernivtsi, 1995. 384 p.
- Ponomarenko, L.: *Nekhoroshch* [Artemisia]. Poltava: Dyvosvit, 2016. 192 p. ISBN 978-617-633-163-6.
- Rozdobudko, Iren: *Amulet Paskalia* [Pascal’s amulet]. Kharkiv: Folio, 2011. 190 p. ISBN 978-966-03-2766-5.
- Matos, M.: *Chotyry pory zhyttia* [Four seasons of life]. Lviv: Literaturna ahentsiia “Piramida”, 2011. 264 p. ISBN 978-966-441-213-8.
- Chekh, A.: *Tsoho vy ne znaidete v Yandeksi* [You are not to find this in Yandex]. Kharkiv: Folio, 2007. 224 p. ISBN 978-966-03-3898-2.
- Irvanets, O.: *Khvoroba Libenkrafta* [The illness of Libenkraft]. Kharkiv: Folio, 2010. 192 p. ISBN 978-966-03-5310-7.
- Lys, V.: *Kraina hirkoi nizhnosti* [The land of bitter tenderness]. Kharkiv: Klub simeinoho dozvillia, 2015. 368 p. ISBN 978-966-14-8772-6.
- Dochynets, M.: *Krynychar. Diariush naibahatshoho cholovika Mukachivskoi dominii* [Sorcerer. The diary of the richest man in the Mukachevo dominion]. Mukachevo: Karpatska vezha, 2012. 332 p. ISBN 978-966-8269-30-1.
- Volvach, P.: *Kliaksa* [A Blot]. Ternopil: Dzhura, 2004. 284 p. ISBN 966-8017-89-7.
- Göpferich, S.: *Textproduktion im Zeitalter der Globalisierung: Entwicklung einer Didaktik des Wissenstransfer* [Text production in the age of globalization: Development of a didactics of knowledge transfer]. Tübingen: Stauffenberg-Verlag, 2008. 499 p. ISBN 978-3-86057-254-2.
- Blumenthal, P.: *Sprachvergleich Deutsch-Französisch* [Language comparison German-French]. Tübingen: Niemeyer, 1987. 136 p. ISBN 978-3-48454-029-3.

Primary Paper Section: A

Secondary Paper Section: AI

TRENDS IN STRATEGIC HUMAN RESOURCE MANAGEMENT: EMPLOYER BRAND ATTRACTIVENESS

^aRENATA SKÝPALOVÁ, ^bMONIKA VENCOUROVÁ,
^cVENDULA HYNKOVÁ

*Department of Economics and Management, AMBIS College,
Lindnerova 575/1, 18000 Praha 8, Czech Republic*

email: ^arenata.skypalova@ambis.cz,

^bmonika.vencourova@ambis.cz, ^cvendula.hynkova@ambis.cz

Abstract: Employer brand management has become a growing necessity. For most companies, it does not mean the random short-term campaigns, but the crucial factor in successfully building the employer brand being the employees themselves. The aim of the paper is to present the findings from a questionnaire survey of selected factors that affect the employer brand image as a strategic tool for human resource management from the perspective of HR staff in the Czech Republic. The research was carried out from May 2019 to January 2020, 112 respondents (HR managers) taking part in it. The results show that systematic employer brand creation is conditional upon the company's personnel strategy. Appropriate use of the brand helps retain the existing employees. Satisfied staff are more likely to become ambassadors for the company brand, engaging in its communication towards the external labour market. Being a matter for the competence of the personnel department, employer branding must be integrated into HR managerial strategies. The results of the survey also support the assumption that the requirements and expectations of both current and prospective employees are to be complied with, the company's competitive advantage in the labour market thus being secured.

Keywords: human resource management, employer brand, Czech Republic, labour market

1 Introduction

Enterprises are aware of the importance of skilled staff, both current and prospective. Striving to become long-term attractive employers, thus gaining a competitive advantage, they develop their human resource management strategies, including employer branding.

In modern companies, attractiveness, profitability, and future operations depend on their readiness to put employees and potential employees first and recognize them as the most important stakeholders for organizational development (Tkalac Verčič, 2021). Attracting, hiring, and retaining skilled workers are critical for the success of any firm (Arijs et al., 2018; Theurer et al., 2018). Due to several trends, such as the population aging and the shift towards a knowledge economy, the competition of attracting employees with specific skills and knowledge has risen markedly (Carpentier et al., 2019; Ployhart et al., 2017). Consequently, the need to understand how to attract applicants and influence word-of-mouth has increased sharply (Carpentier et al., 2017; Theurer et al., 2018). Other authors (Dabirian et al. (2017) claim in their study that work environments do not emerge by happenstance, but rather result from deliberate and strategic initiatives aimed at attracting, engaging, and retaining employees. Organisations must recognize and offer the benefits that current and potential employees want. According to Tkalac Verčič & Čorić (2018), employer brands help potential employees in understanding their future workplace. The lack of sufficient and satisfactory communication is one of the most common issues in contemporary companies. Improving employee engagement adds to a higher level of perceived organizational support, that in turn adds to employer brands (Tkalac Verčič & Vokić, 2017). Dabirian et al. (2017) identified seven values of the employer's brand, that matter to current, former, and potential employees. These propositions include (1) social elements of work, (2) interesting and challenging work tasks, (3) the extent to which skills can be applied in meaningful ways, (4) opportunities for professional development, (5) economic issues tied to compensation, (6) the role of management, and (7) work/life balance. These propositions also develop competitive advantage.

The employer brand is intended to facilitate the prioritization of HR department's tasks, streamlining the recruitment of new employees while retaining the current ones, strengthening the engagement of the latter, and motivating them to participate in

employer brand communication. According to Sharma (2019), building an employer brand must be reflected in the company's strategic and marketing goals, and vice versa, the company's objectives must be considered in a brand creation. Since companies start to understand the employer brand as an important aspect of their future growth and competitiveness, Sharma (2019) envisages the potential for success.

A significant issue in the US and the UK is attracting quality talent (Cheesman, 2017), that shows the importance of preserving the employer brand and promoting the company's reputation as a desirable employer on social media, each of which is more important than ever. The applicants' experience is a key outcome with implications for a firm. A focus on the employer brand's long-term development within a dynamically changing environment is therefore of particular importance, its systematic construction facilitating strategic workforce planning. (Theurer et al., 2018; Dabirian et al., 2017; Barbaros, 2020).

This paper examines the factors affecting the attractiveness of the employer brand as a strategic tool in human resource management. Its aim is to present the findings from a questionnaire survey conducted among HR staff in the Czech Republic. The paper is divided into five parts. In addition to the general introduction to the issue of employer branding, the first two sections outline the previous research outcomes, referring to the selected publications. In the following section, the methodology of the questionnaire survey is described. The main section presents and discusses the results. Summarizing the acquired knowledge, the last section draws practical conclusions and acknowledges the limitations of the present research, giving suggestions for its continuation.

2 Literature references

The employer brand should be true and authentic (i.e., in line with reality), distinguishable from competitors' brands (offering identifiable unique values) and attractive to members of the target audience (see, e.g., Ambler & Barrow, 1996; Backhaus & Tikoo, 2004). The employer brand construction requires the cooperation of marketing and HR departments, allowing for reasonable attractive job offers and fulfilling both the needs of employees and strategic goals of the company (cf. Cable & Graham, 2000).

Barbaros (2020) highlights the following practical ideas in his study: a) management teams must have a holistic approach of employer branding, organizational attractiveness, and company culture; b) employer branding, in order to become a useful tool for employees' retention and recruitment, must be managed by both the HR Department and the Marketing and Communication Department within a coordinated and coherent strategy and c) for employer branding to be efficient, there is a need to leverage HR as a strategic partner and, as a result, employees will be developed into strategic assets of the company. Kucharska & Kowalczyk (2019) add that the Employer Branding strategy must be carefully thought out and implemented.

Meeting the expectations of current employees is as important as a valuable offer for external job seekers, communication being an essential element of the employer brand building strategy (cf. Cable & Graham, 2000). Carpentier et al. (2019) find in their study the way the company communicates it plays an important role in the process of perceiving the employer's brand. Potential applicants form a mental picture of what a firm is like as an employer (Dineen, 2019). Companies that communicate in a more personal, friendly, and social way, are generally perceived as more attractive (Frasca & Edwards, 2017). In today's corporations, engaged employees represent a competitive advantage. The more attractive the employer, the stronger the employer's brand. (Ruchika & Prasad, 2017). The importance of the applicant experience during the recruitment process is critical in the company's quest to win the war on talent. The recruitment

process has a two-fold objective: hire quality applicants and ensure a positive applicant experience, as shown by the study by Miles & McCamey (2018). Miles & McCamey (2018) also conclude that an applicant's positive experience accurately reflects and strengthens the employer's desired brand, also improving recruitment results, while a negative experience can lead the applicant to leave the competition. Positive and negative experiences affect the attractiveness of the employer. Ensuring a positive applicant experience requires a comprehensive, well-thought-out plan to ensure the applicant's experience promotes the employer brand in the way the company desires. The quality of talent increases as more people seek employment in companies having a strong employer brand reflected in the public area (Miles & McCamey, 2018). According to a CareerArc study (2016), almost 60% of jobseekers reported they had a bad recruitment experience, while 72% stated they shared this negative experience online. And 61% of Glassdoor (2016) users report that they seek company reviews and ratings before deciding to apply for a job.

2.1 Employer brand attractiveness

Closely related to the employer's brand is the employer's attractiveness that describes the extent to which the job seeker is interested in working in the company. The attractiveness of the employer reflects the strength and value of the employer's brand. (Kapuściński et al., 2021; Carpentier & Van Hoye, 2021) Employer branding is applied to improve employer attractiveness that is defined as the sum of benefits seen by employees of a specific firm (Arasanmi & Krishna, 2019; Kang & Sung, 2017). A lot of studies have sought to explore ways to create or enhance a positive or favourable perception of employer attractiveness (e.g., Carpentier et al., 2017; Frasca and Edwards, 2017; Klimkiewicz and Oltra, 2017). A national study by Tkalac Verčič (2021) that involved 1805 employees from twelve large corporations, shows there is a relationship between employee engagement, employer brand, perceived organizational support, and satisfaction with internal communication. And all this mentioned influences the attractiveness of a corporation (Tkalac Verčič, 2021).

Factors influencing the attractiveness of an employer brand are based on thought connections (specific cognitive associations) that emerge in the minds of potential applicants (Rampl, 2014). The attractiveness of a particular employer brand manifests itself as the applicant's desire to work for this company (cf. Collins & Stevens, 2002; Lievens, 2007).

2.2 Employer brand as a competitive advantage in the labour market

Companies successfully managing their employer brand can attract more job seekers and better retain their current staff. An employer's brand is also a way for firms to differentiate themselves from their competitors. (Tkalac Verčič & Ćorić, 2018). Companies have always cared about what their employees think and say about them. Collective employee opinions shape not only the loyalty, engagement, and retention of existing workers, but also how the companies are seen publicly and how they are able to attract new talent (Dabirian et al., 2017).

According to a 2011 LinkedIn survey, up to 69% of employees consider the brand to be a major factor in choosing an employer (Market Research Explained, 2019). It can thus be viewed as a tool differentiating the company from its competitors (Ito et al., 2013).

The main objective in building the employer brand is to achieve a long-term competitive advantage in the labour market. Assuming corporates compete for their current and potential employees, it is necessary to devise new strategies to recruit, retain and develop talents. Some authors consider the employer brand to be a long-term strategy that is the optimal "weapon" in a highly competitive environment (see, e.g., Foster et al., 2021; Jain & Bhatt, 2015).

In the age of the 'War for talents' (Sommer et al., 2016), many companies invest significant number of resources in building strong and resilient employer brands to compete for high-quality workforce. Research on small and medium-sized companies suggests that the systematic employer brand building can help attract the required employees, thus enhancing competitiveness vis-à-vis corporations (cf. Sharma, 2019).

3 Methods

Following previous studies on employer branding, the present paper provides the results of a questionnaire survey undertaken among HR staff in the Czech Republic between May 2019 and January 2020. The questionnaire contained 26 open, semi-closed and closed (multiple-choice) questions. The survey was conducted electronically using Google Forms.

The respondents were HR managers in charge of employer branding in the firms addressed. The questions focused on four areas of the company's activities – basic information about the employer brand, activities performed in-house and those directed towards applicants on the labour market, and problematic aspects of maintaining the employer brand attractiveness. Based on the obtained data, the relationships and dependencies were explored, and established hypotheses verified.

The Amadeus database operated by Bureau van Dijk (cf. Bureau van Dijk, 2020), which contains data on approximately 19 million companies from 43 European countries, was used for sampling the respondents. The companies were selected applying the following criteria:

Company status: active.
Country: Czech Republic.
Number of employees: min. 50 (2016, 2015, 2014, 2013).
Annual turnover: min. €100 000 (2016, 2015, 2014, 2013).
Category: Large and medium-sized enterprises.
Contact: website, e-mail.

In the Amadeus database, 478 companies met the above criteria. 442 of them were contacted; for 36 companies, neither a website address nor a contact for a competent person was available. 112 companies answered the submitted questionnaire.

Based on the yielded data, it was possible to verify the validity of the following hypotheses. H1: Systematic employer brand building is related to a clearly defined personnel strategy. H2: The presence of a staff member responsible for building the employer brand is related to a clearly defined personnel strategy. H3: The regular frequency of detecting the involvement of the company's own staff is related to the employer brand attractiveness. H4: The frequency of detecting applicants' perception of the company is related to the attractiveness of the employer brand.

The data were processed using an MS Excel spreadsheet. The independence of nominal variables was subsequently evaluated by the STATISTICA program. The chi-square tests of independence included the following six steps: (1) the formulation of the null (H0) and alternative (HA) hypotheses, (2) the selection of a 5% level of significance, (3) the calculation of

the chi square statistic $\chi^2 = \sum \left[\frac{(O_{r,c} - E_{r,c})^2}{E_{r,c}} \right]$, where O are observed frequencies, E expected frequencies, and r and c the numbers of rows and columns in the contingency table, respectively, (4) the calculation of the degrees of freedom $f = (r-1) \times (c-1)$, (5) the selection of the critical chi-square value $\chi^2_{\alpha}(f)$, and (6) comparison of the chi square statistic χ^2 to the critical chi-square value $\chi^2_{\alpha}(f)$ and the acceptance or rejection of the null hypothesis.

The strength of the dependence is measured using the Cramér's V correlation coefficient, which is based on χ^2 statistics. $V =$

$$z = \sqrt{\frac{K}{n(m-1)}}$$
, where $m = \min\{r, s\}$. Taking the values between 0 and 1, the closer the Cramér's V is to 1, the tighter the relationship between X and Y. The closer it is to 0, the looser this relationship becomes (cf. Berk & Carey, 2009).

4 Results and discussion

Employer branding has not yet been properly integrated into the corporate organizational structure. It is usually the personnel department that is in charge, supposed to coordinate the related activities, the employer brand integration into human resource management depending on the level of brand centralization. A discussion about who actually is responsible for building it (recently prompted by the US agency Brandemix) is underway. In the Czech Republic, according to the present survey, 83% of HR staff pursue this agenda.

The 2019 questionnaire outcomes show that the HR department is part of the senior management in 64 (i.e., 57.14%) of the 112 companies surveyed, and in the remaining 48 (42.86%) firms it reports to the upper or middle management, not a single respondent choosing the possibility that the personnel department is not part of the management at all. The survey also reveals that 71.43% of companies set up a separate budget for the HR department to finance their personnel strategy, which may include employer branding. (The budget is approved by either the top management, the CEO, the board of directors, the owner of the company, or the global HR manager in the case of international corporations.)

The present analysis also focused on key factors that increase the attractiveness of the employer brand. Only 57.14% of firms pursue employer branding systematically, while 7.14% completely ignore it; see the left part Table 1 below. It was also examined whether the companies have a coherent personnel strategy, thus developing workforce management in the long run. 78.57% of respondents report they are dedicated to building an employer brand as an instrument for strategic development and competitiveness in the labour market; see Table 1 again.

Table 1: Employer branding involvement

Out of all 112 respondents, employer branding is pursued...	Relative frequency	Out of 88 companies that have a set personnel strategy, employer branding is pursued ...	Relative frequency
systematically	57.14%	systematically	72.72%
randomly	35.71%	randomly	18.18%
not at all	7.14%	not at all	9.10%
Σ	100%	Σ	100%

Source: authors' own elaboration

If a company decides to utilize a global employer brand, the emphasis is on the brand itself, the differences between the countries in which the company operates not being considered. If desired, however, the firm may create a local employer brand considering the specifics of the country (see Tkalac Verčič, 2021). The most significant trends in global human resource management are employee engagement and stability, and the acquisition of skilled staff, the employer brand supporting them considerably (Carpentier et al., 2019; Tkalac Verčič & Čorić, 2018).

In terms of strategic HR budgeting, the survey showed that 42.86% of firms planned to increase investments in personnel strategy (and therefore in employer branding) in the following year, half of the firms intended to keep them at the same level, and in 7.14% of cases respondents considered reducing investments. Regarding the personnel department, its support from other company units was inquired about as well. Public relations (in 56 cases), marketing (24), business excellence (16) and finance (8) departments, as well as the heads of ones (48), are also involved in communication with the internal and external labour market.

Cooperation of units is a prerequisite for the smooth running of the company. In practice, unfortunately, the larger the company, the more competitive the rivalry between departments, HR and PR ones being reported as the most frequently cooperating (42.86%). Depending on the need and urgency of the situation, the heads of individual departments get involved. Table 2 displays the outcomes of a quantitative evaluation of the given research hypotheses focused on key areas of employer branding implementation. The frequency of detecting applicants' perception of the company is related to the attractiveness of the employer brand.

Table 2: Hypothesis tests

	Independence test	
	Pears. chi-sq.	Cramér's V
H1: Systematic employer brand building is related to a clearly defined personnel strategy.	p=0,023913	0,2581989
H2: The presence of a staff member in charge of building the employer brand is related to a clearly defined personnel strategy.	p=0,627089	X
H3: The regular frequency of detecting the engagement of the company's own staff is related to the employer brand attractiveness.	p=0,00000	0,7791937
H4: The frequency of detecting applicants' perception of the company is related to the attractiveness of the employer brand.	p=0,00000	0,6422616

Source: authors' own calculations, 5% significance level

Note: x – Cramér's V was not calculated because the hypothesis was rejected.

4.1 Personnel strategy importance for employer brand building (I)

The results show that 42.86% of companies surveyed have a clearly designed personnel strategy. Systematically or randomly, 28.57% and 14.29%, respectively, devote attention to employer branding as can be seen in Table 1.

Based on Pearson's test, H1 hypothesis (the systematic nature of employer brand building is not related to the existence of a clearly defined personnel strategy) was rejected at the 5% level of significance. According to Cramér's V, the dependence between the variables is weak. It can be concluded that the methodical construction of the employer brand is related to a properly defined personnel strategy. Without it, the employer brand can be neither systematically built nor effectively managed.

4.2 Personnel strategy importance for employer brand building (II)

The HR department is responsible for the creation and maintenance of the employer brand. A current staff member or a newly hired employee can be charged with the task of building the employer brand or, alternatively, the company can ensure cooperation with an external partner. However, there are firms that do not yet have an employee who would fill this position. Some plan to establish it, others do not even consider it. The present findings show that 64.29% of the companies surveyed employ an internal or external worker who is responsible for building the employer brand. Exactly 28.57% of companies follow a clearly defined personnel strategy, 35.71% having no strategy at all. The questionnaire responses "We are currently filling the position" and "No, we do not have it, but we are considering its creation" were not chosen by any participant. Of the 35.71% of companies that do not have the position in question, not even considering its establishment, 14.29% have a clearly defined personnel strategy, while 21.43% do not.

According to Pearson's test, hypothesis H2 (the presence of an employee in charge of building an employer brand is not related to a clearly defined personnel strategy) is not rejected at the 5% significance level. It is obvious that the appointment of a person responsible for employer brand construction does not guarantee that an appropriate personnel strategy is launched. This is also confirmed by the present findings, 57.14% of the surveyed companies not reporting a well-designed personnel strategy. A

possible explanation is either that even relevant goals do not have to be based on a specific strategy or only short-term objectives are set. It is commonly assumed that the HR department makes use of the employer brand only to take on new employees, but not to develop relationships with the external and internal labour market. Company officials often argue that they must first hire enough new staff so that all positions are filled, and the firm can cut their current employees' overtime, not realizing that an exclusive focus on recruiting is ineffective in the long run. A comprehensive plan for how and to whom to communicate the brand allows the company to secure the necessary number of suitable applicants, thus reducing lingering vacancies in the long term. Thoughtful and purposeful communication saves the company time and energy to improve relationships with the existing employees.

4.3 Employer brand as a tool for retaining current employees

Tactics and activities designed to systematically create and maintain the employer brand should apply not only to the external but also to the internal labour market. Research studies have confirmed that proper employer branding begins as an internal company process. Only when its core values are defined, they can be communicated outside the company (see, e.g., Arijs et al., 2018; Theurer et al., 2018).

The employer brand helps the company identify and implement tactics for the continuous development and motivation of employees, significantly affecting their satisfaction. The positive impact is reflected in their commitment and loyalty (cf. Miles & McCamey, 2018).

Optimally, the employer brand can retain the best people, creating an environment that allows employees to promote the brand, increasing their satisfaction and the likelihood that they will remain in the company (see Arijs et al., 2018; Theurer et al., 2018). The loss of experienced professionals can have a profound economic impact on the employer (Dabirian et al., 2017). On the other hand, employees who like to work for a company may become its employer brand ambassadors (cf. Kapuściński et al., 2021).

The employer brand affects not only job seekers, but especially current employees. Its attractiveness, in general, is decisive in determining whether an employee is sticking with it. Therefore, it is necessary to conduct regular employee satisfaction surveys, respond to them and incorporate employee proposals. The interest of the senior management in the well-being of staff, their career and professional growth, improving the work environment and corporate culture, ultimately strengthens internal company relationships and cooperation across departments. Undoubtedly, individual employees differ in their perception of the employer brand attractiveness. Building it, however, presupposes finding out what motivates employees to work for the company and what it is valued for. If the company ignores this, it can cause employee dissatisfaction and high turnover. Questionnaire results indicate that 78.58% of surveyed firms are interested in why employees stay with them, and therefore what they appreciate. Half of the companies carry out job engagement surveys every year, 14.29% once every two years and the same percentage irregularly. Only 21.42% of the firms in question do not verify why their employees still work for them.

Based on Pearson's test, H3 hypothesis (the regularity of the survey of employee engagement is not related to the employer brand attractiveness) is rejected at the 5% significance level. According to the Cramér's V test, the dependence between the variables is strong. It can be concluded that regular surveying of employee involvement is related to the attractiveness of the employer brand, which can become a powerful tool for retaining the existing staff. The brand's effective use increases the long-term satisfaction of employees who can become its ambassadors, getting involved in its communication towards the external labour market, appropriate tools and activities being utilized.

4.4 Employer brand as a tool for getting potential employees

A strong employer brand helps companies lure suitable applicants through better recruitment strategies. At the beginning of the process, the firm tries to attract job seekers to its vacancies. To become a recognized employer, the company must constantly develop its attractiveness. If the employer brand is managed systematically, it can also raise the number of serious applicants, serving as a cost-effective and time-efficient tool. Ideally, the company becomes the so-called preferred employer, choosing from enough applicants. Since long-term vacancies are loss-making for the company, it is desirable to speed up and streamline recruitment procedures. Firms' experience shows that strong brands are succeeding in reducing recruitment costs while increasing the number of applicants (cf. Sharma, 2019; Barbaros, 2020).

As mentioned above, the employer brand is an efficient means of recruiting new staff. Their perception of the attractiveness of a potential employer must therefore also be detected. Based on the findings, it is then possible to identify the criteria that are preferred by applicants when choosing a company. The present survey shows that 92.86% of firms ask applicants how they perceive them as employers; 28.57% always ask this question, 35.71% very often and 28.57% occasionally. The remaining interviewed companies (i.e., 7.14%) do not find out how job applicants see them as prospective employers.

According to Pearson's test, hypothesis H4 (the frequency of detecting applicants' perception of the company is not related to the attractiveness of the employer brand) is rejected at a 5% level of significance. According to the Cramér's V coefficient, the dependence between the variables is medium. Thus, it can be stated that the frequency of surveying the perception of the firm by applicants is related to the employer brand attractiveness. This attractiveness perception varies, depending on whether the applicants are just entering the labour market or have a certain work history, whether they are building a career or are already experienced workers looking for new challenges. Applicants' preferences vary in other respects as well. Some are looking for an international environment, others a family business. There are also various requirements regarding the size and location of the company. For some people, job satisfaction means high pay, fringe and other benefits provision, professional growth prospects, part-time employment, and flexible working hours, or telecommute and work-from-home models. An attractive employer brand should clearly define who its target applicants are and what employee benefits it can offer.

A systematic approach using the right tools results in the building of a strong employer brand that not only motivates the existing employees, but also attracts and retains suitable applicants who will resonate with it. Such a brand captures attention of people who set themselves ambitious goals. A strong employer brand thus becomes an attractive one with the potential for applicants to actively seek it out themselves (Kapuściński et al., 2021; Barbaros, 2020).

The failure of employer brand building may be associated with the lack of interest of senior management which is not convinced of the effectiveness of the concept and accompanying measures that often require considerable costs to be incurred. Such concerns can be avoided by carefully planning measurable outputs, costs, and the implementation schedule so that the success of the employer brand concept can be reliably assessed. Reluctance on the part of employees themselves can also make a hindrance. A major obstacle is posed if the employer brand is managed by the parent company which centrally imposes a unified procedure and activities. This occurs when the corporate management enforces its own concept, not allowing local modifications.

5 Conclusion

This paper advocates the importance of creating an attractive employer brand as a significant part of strategic human resource

management. Employer branding is a long-term process allowing companies to respond to the expectations of potential and existing employees, recognition of their needs being an essential prerequisite. Ultimately, the employee brand brings a lasting competitive advantage in the labour market. Most effective in this respect is a reasonable job offer along with professional development opportunities.

The present research confirmed that there is a connection between the systematic building of the employer brand and a clearly defined personnel strategy. Without the latter, the brand cannot be effectively managed, and the tactics and activities utilized. Purposeful communication of the employer brand requires a methodical procedure for setting the objective and strategy of its creation, allowing to communicate it to both internal and external labour market.

The results showed that the person in charge of building the employer brand is not a guarantee that an appropriate personnel strategy is developed. This may be explained by the fact that companies adhere to certain goals that are not part of a specific strategy or pursue only short-term ones. It can also be assumed that the HR department uses the employer brand only to take on new employees, but not to build relationships with external and internal labour markets. However, many companies do not realize that a sole focus on recruiting new staff is short-sighted and ineffective in the long run. If the firm devises a systematic procedure for how and to whom to communicate the brand, it can attract the optimal number of applicants. Thanks to skilful communication, the company can save energy and time to improve relationships with current employees as well.

Further, a link between the regularity of surveying the staff engagement and the employer brand attractiveness was confirmed. The employer brand can be a reliable instrument for keeping the existing employees. Its proper use can also bring the company satisfied staff who, as its bearers, get involved in the brand communication towards the external labour market. It is necessary to start from within the company because the employer brand must be based on an analysis of the current situation in the internal and external labour market, communicating it properly afterwards, applying appropriate tools and activities.

The frequency of detecting the perception of the company by applicants is also related to the employer brand attractiveness. This perception varies, depending on whether the applicants are entering the labour market, launching their careers, or have previous work experience and are looking for further challenges. The choice between domestic vs. foreign employers, a large enterprise, or a small family business, a remote or close location also has an effect. Applicants differ in their emphasis on various factors of job satisfaction, such as high salaries, employee benefits, prospects for professional growth, flexible working hours, teleworking opportunities, etc. An attractive employer brand should be aware of what job seekers it is targeting and what benefits it can offer them.

The present results suggest that HR managers integrate employer branding into their agenda as part of personnel strategies, learn how to identify requirements of potential employees, and provide valuable employment opportunities. Employers should have a better understanding of the specific needs and expectations of both applicants and the existing employees.

The relatively narrow focus on the labour market of the Czech Republic and a certain respondent sample size here limits the generalizability of the present findings. Despite the limitations, they should be attended by HR specialists responsible for managing the workforce in corporates. The results of this paper can serve as a springboard for further research into the attractiveness of the employer brand whose construction is the manifestation of a new approach to human resource management applied in the labour market.

Literature:

1. Ambler, T. – Barrow, S.: The employer brand. In *Journal of brand management*, 4 (3), 1996, pp. 185-206. <https://doi.org/10.1057/bm.1996.42>.
2. Arasanmi, C. N. – Krishna, A.: Linking the employee value proposition (EVP) to employee behavioural outcomes. In *Industrial and Commercial Training*, 51 (7/8), 2019, pp. 387-395. <https://doi.org/10.1108/ICT-05-2019-0043>.
3. Arijis, D. – Botero, I. C. – Michiels, A. – Molly, V.: Family business employer brand: Understanding applicants' perceptions and their job pursuit intentions with samples from the US and Belgium. In *Journal of Family Business Strategy*, 9 (3), 2018, pp. 180-191. <https://doi.org/10.1016/j.jfbs.2018.08.005>.
4. Backhaus, K. – Tikoo, S.: Conceptualizing and researching employer branding. *Career Development International*, 9 (5), 2004, pp. 501-517. <https://doi.org/10.1108/13620430410550754>.
5. Barbaros, M. C.: Does employer branding beat head hunting? The potential of company culture to increase employer attractiveness. In *Journal of Entrepreneurship, Management, and Innovation*, 16 (4), 2020, pp. 87-112. <https://doi.org/10.7341/20201643>.
6. Berk, K. – Carey, P.: *Data Analysis with Microsoft Excel*. Brooks/Cole, 2009. ISBN 9780495831495.
7. Bureau Van Dijk.: *Amadeus*. Retrieved October 22, 2020. Retrieved from <http://www.bvdinfo.com/Products/Company/information/International/AMADEUS.aspx>.
8. Cable, D. M. – Graham, M. E.: The determinants of job seekers' reputation perceptions. In *Journal of Organizational Behavior*, 21 (8), 2000, pp. 929-947. [https://doi.org/10.1002/1099-1379\(200012\)21:8<929::AID-JOB63>3.0.CO;2-O](https://doi.org/10.1002/1099-1379(200012)21:8<929::AID-JOB63>3.0.CO;2-O).
9. CareerArc: *Survey connects poor candidate experience to limits in future job applications*. Retrieved from <https://www.careerarc.com/in-the-news/survey-connects-poor-candidate-experience-to-limits-in-future-job-applications>.
10. Carpentier, M. – Van Hoyer, G.: Managing organizational attractiveness after a negative employer review: company response strategies and review consensus. In *European Journal of Work and Organizational Psychology*, 30 (2), 2021, pp. 274-291. <https://doi.org/10.1080/1359432X.2020.1718748>.
11. Carpentier, M. – Van Hoyer, G. – Weijters, B.: Attracting applicants through the organization's social media page: Signaling employer brand personality. In *Journal of Vocational Behavior*, 115, 2019. <https://doi.org/10.1016/j.jvb.2019.103326>.
12. Carpentier, M. – Van Hoyer, G. – Stockman, S. – Schollaert, E. – Van Theemsche, B. – Jacobs, G.: Recruiting nurses through social media: Effects on employer brand and attractiveness. In *Journal of Advanced Nursing*, 73 (11), 2017, pp. 2696-2708. <https://doi.org/10.1111/jan.13336>.
13. Cheesman, J.: Glassdoor survey: This is the largest problem facing American and UK employers. *ERE Media*, 2017. Retrieved from <https://www.ere.net/glassdoor-survey-largest-problem-for-employers/>.
14. Collins, C. – Stevens, C.: The relationship between early recruitment-related activities and the application decisions of new labor-market entrants: A brand equity approach to recruitment. In *Journal of Applied Psychology*, 87 (6), 2002, pp. 1121-1133. <https://doi.org/10.1037/0021-9010.87.6.1121>.
15. Dabirian, A. – Kietzmann, J. – Diba, H.: A great place to work!? Understanding crowdsourced employer branding. In *Business Horizons*, 60 (2), 2017, pp. 197-205. <https://doi.org/10.1016/j.bushor.2016.11.005>.
16. Dineen, B. R. – Van Hoyer, G. – Lievens, F. – Rosokha, L. M.: Third party employment branding: What are its signaling dimensions, mechanisms, and sources? In *Research in Personnel and Human Resources Management*, 37, 2019, pp. 173-226. <https://doi.org/10.1108/S0742-730120190000037006>.
17. Foster, C. – Punjaisri, K. – Cheng, R.: Exploring the relationship between corporate, internal and employer branding. In *Journal of Product & Brand Management*, 19 (6), 2010, pp. 401-409. <https://doi.org/10.1108/10610421011085712>.
18. Frasca, K. J. – Edwards, M. R.: Web-based corporate, social, and video recruitment media: Effects of media richness and source credibility on organizational attraction. In *International Journal of Selection and Assessment*, 25 (2), 2017, pp. 125-137. <https://doi.org/10.1111/ijsa.12165>.

19. Glassdoor: *Top HR statistics: The latest stats for HR and recruiting pros.*, 2016. Retrieved from <https://www.glassdoor.com/employers/popular-topics/hr-stats.htm>.
20. Ito, J. – Brotheridge, C. M. – McFarland, K.: Examining how preferences for employer branding attributes differ from entry to exit and how they relate to commitment, satisfaction, and retention. In *Career Development International*, 18 (7), 2016, pp. 732-752. <https://doi.org/10.1108/CDI-05-2013-0067>.
21. Jain, N. – Bhatt, P.: Employment preferences of job applicants: Unfolding employer branding determinants. In *Journal of Management Development*, 34 (6), 2015, pp. 634-652. <https://doi.org/10.1108/JMD-09-2013-0106>.
22. Kang, M. – Sung, M.: How symmetrical employee communication leads to employee engagement and positive employee communication behaviors: The mediation of employee-organization relationships. In *Journal of Communication Management*, 21 (1), 2017, pp. 82-102. <https://doi.org/10.1108/JCOM-04-2016-0026>.
23. Kapuściński, G. – Zhang, N. – Zeng, L. – Cao, A.: Effects of crisis response tone and spokesperson's gender on employer attractiveness. In *International Journal of Hospitality Management*, 94, 2021. <https://doi.org/10.1016/j.ijhm.2021.102884>.
24. Klimkiewicz, K. – Oltra, V.: Does CSR enhance employer attractiveness? The role of Millennial job seekers' attitudes. In *Corporate Social Responsibility and Environmental Management*, 24 (5), 2017, pp. 449-463. <https://doi.org/10.1002/csr.1419>.
25. Kucharska, W. – Kowalczyk, R.: How to achieve sustainability? - Employee's point of view on company's culture and CSR practice. In *Corporate Social Responsibility and Environmental Management*, 26(2), 2019, pp. 453-467. <https://doi.org/10.1002/csr.1696>.
26. Lievens, F.: Employer branding in the Belgian Army: The importance of instrumental and symbolic beliefs for potential applicants, actual applicants, and military employees. In *Human Resource Management*, 46 (1), 2007, pp. 51-69. <https://doi.org/10.1002/hrm.20145>.
27. Market Research Explained: *Esomar, the global insights community*, 2019. Retrieved November 1, 2020. Available at: <https://www.esomar.org/market-research-explained>.
28. Miles, S. J. – McCamey, R.: The candidate experience: Is it damaging your employer brand? In *Business Horizons*, 61 (5), 2018, pp. 755-764. <https://doi.org/10.1016/j.bushor.2018.05.007>.
29. Ployhart, R. E. – Schmitt, N. – Tippins, N. T.: Solving the supreme problem: 100 years of selection and recruitment at the Journal of Applied Psychology. In *Journal of Applied Psychology*, 102 (3), 2017, pp. 291-304. <https://doi.org/10.1037/apl0000081>.
30. Rampl, L. V.: How to become an employer of choice: transforming employer brand associations into employer first-choice brands. In *Journal of Marketing Management*, 30 (13-14), 2014. <https://doi.org/10.1080/0267257X.2014.934903>.
31. Ruchika – Prasad, A. Untapped relationship between employer branding, anticipatory psychological contract, and intent to join. In *Global Business Review*, 20 (1), 2017, pp. 194-213. <https://doi.org/10.1177/0972150917713897>.
32. Sharma, S.: Employer Branding: A Novel Route to Employee Retention and Competitive Advantage. In *Journal of General Management Research*, 6(1), 2019, pp. 14–31.
33. Sommer, L. – Heidenreich, S. – Handrich, M.: War for talents - how perceived organisational innovativeness affect employer attractiveness. In *R&D Management*, 47 (2), 2016, pp. 299-310. <https://doi.org/10.1111/radm.12230>.
34. Theurer, C. P. – Tumasjan, A. – Welp, I. M. – Lievens, F.: Employer branding: A brand equity-based literature review and research agenda. In *International Journal of Management Reviews*, 20 (1), 2018, pp. 155-179. <https://doi.org/10.1111/ijmr.12121>.
35. Tkalac Verčič, A.: The impact of employee engagement, organisational support, and employer branding on internal communication satisfaction. In *Public Relations Review*, 47 (1), 2021. <https://doi.org/10.1016/j.pubrev.2021.102009>.
36. Tkalac Verčič, A. – Pološki Vokić, N.: Engaging employees through internal communication. In *Public Relations Review*, 43 (5), 2017, pp. 885-893. <https://doi.org/10.1016/j.pubrev.2017.04.005>.
37. Tkalac Verčič, A. – Sinčić Čorić, D.: The relationship between reputation, employer branding and corporate social responsibility. In *Public Relations Review*, 44 (4), 2018, pp. 444-452. <https://doi.org/10.1016/j.pubrev.2018.06.005>.

Primary Paper Section: A

Secondary Paper Section: AM, AH

THE SPECIFIC SUITABLE METHODS FOR DEVELOPING OF PSYCHOPHYSICAL FITNESS AND DECISION-MAKING SKILLS OF MANAGERS

^aPAVEL SLÁDEK, ^bDAVID ULLRICH, ^cVERONIKA LACINOVÁ, ^dFRANTIŠEK MILICHOVSKÝ

^{a,b,c} *Brno University of Defence, Faculty of Military Leadership, Kounicova 65, 662 10 Brno, Czech Republic*

^d *Brno University of Technology, Faculty of Business and Management, Department of management, Kolejní 2906/4, 612 00 Brno, Czech Republic*

email: ^apavel.sladek@unob.cz; ^bdavid.ullrich@unob.cz; ^cveronika.lacinova@unob.cz; ^dmilichovsky@fbm.vutbr.cz

Abstract: The experiment consisted of testing the effects of the complex physical and psychological load in the context of the ability of subsequent visual attention and mental concentration. Measurements took place before and after passing the method. Eighteen managers attended. Participants could sign out at any time. The program was designed to identify the desired attributes of individuals able to adapt to a dynamically changing environment. Their organism is more resistant to fatigue, exhaustion and is capable of rapid regeneration. Such properties occur in approximately 20% of individuals. The result of the experiment is dividing participants into four groups with similar performances using diagnostic methods and then selecting several individuals with suitable potentials.

Keywords: psychophysical condition, sweat lodge, increased stress, cognitive performance.

1 Introduction

The management of organization within all particular areas create conditions supporting command activities. For commanding, the main group of particular management areas are control, leadership and human resources development. Nevertheless, all of management areas have long been pointed out that in addition to the expertise and technical skills of commanders and managers in terms of knowledge and skills in specific areas of work and in addition to relating to leadership and communication with people. Also, there is possible to define a trend that emphasizes the qualities and potentials related to mental and other specific aspects of individuals working in leadership (command and management) positions comes to the fore.

Newly, the framework is being created| according to orientation on people capable of commitment with their victory focus and work within a value. Key area is the possibility of self-realization, personal responsibility, and strong point in themselves (principles and values) and, last but not least, an orientation towards people capable of teamwork and synergies (Hroník, 2008, p. 25).

Indications of manifestations of this trend can be found, for example, in some competencies or in conceptual skills that refer to personal mastery and systems thinking (Senge, 2007), to conceptual and complex thinking (Robbins and Coulter, 2004; Hroník, 2008) or to mental maturity, and fitness (Ullrich and Pokorný, 2012; Kiyosaki, 2016).

Experience shows that it is not possible to equate the level of quality of mastery in a professional profession with the quality of holding a managerial position by a given individual in this professional system. This is one of the reasons why Cognitive Management works with the term professional manager and leader as a specific category that is not tied to any professional profession (Ambrozová et al., 2016).

As follows from the analysis of trends in the development of the current security environment, the partial selected outputs in the requirements for personal qualities of commanders, professional managers and leaders are as follows:

- Network literacy and IT management, competence for using the potentials of modern communication and information technologies for networking, information, knowledge and their sharing, creating and organizing relationships and

processes (proactivity, speed, critical, creative, systemic and contextual thinking).

- Ability to cognitively manage the change of conditions and the development of relationships, in terms of mental mobility in decision-making and acting in different environments or situational conditions (decision-making under uncertainty, uncertainty and risk, solving analytical problems, heuristics, etc.).
- Demands for the personality of the individual, resulting from the constantly changing conditions of the professional and personal environment, in terms of the ability to maintain, cultivate and develop psychophysical and mental condition.

In connection with the above, a professional manager for the current security environment could be characterized as an individual who has:

- appropriate qualities of abilities (competencies) for effective decision-making and correct action, creation, organization, cultivation and development of relationships and processes in the human system and its environment, in terms of respect and responsibility for the environment, individuality and activity of each individual;
- meta-skills, in the sense of reflected experience. Meta skills can be seen as the personal qualities of managers that relate to emotions, attitudes, attention, mindfulness and reflection;
- mental maturity, which concerns the levels of quality and the way of cognition, decision-making, acting and leading.

A significant limitation of natural potentials is biological determination, the innate constitution of man, his psychophysical arrangement, structure and activity of the nervous system and its functions (e.g. peculiarities of human experience processing), sensory organs, pre-programmed behavior (instincts) and heredity (Nakonečný, 1998, p. 109). Humans' natural potentials are essentially psychophysical dispositions that individuals naturally own. Physical (biological, physiological) and mental processes and properties cannot be separated. The connection of the psyche to the nervous system, especially to the brain, is a generally accepted postulate (Řičan, 2010). Thus, natural is by its nature neither genetic, hereditary, nor innate, nor just the effect of the environment, culture, social status, etc., usually combined.

Connatural management focuses on identifying, recognizing and developing these natural potentials. It considers them in the following aspects so that the natural potentials:

- They are the gods, the individuals themselves and the system as a whole. They are constantly present and are not obvious in the first place.
- It forms the source environment of human abilities and skills and thus the basis of his mental, psychophysical, personal and social dimensions.
- They appear in the form of qualities of abilities and skills in a situational context (subtle skills).
- - They cannot be acquired or created by learning, nor by education, but they can be discovered, recognized and developed both intuitively, randomly, by situational connection of an individual's natural potential and the influence of the environment, and consciously, purposefully, intentionally.

2 Benefits of methods working with alternating load and attention

The authors point to considerable overlap in areas such as the prevention of certain mental and physical illnesses, group and individual therapeutic work, stress reduction and mental hygiene, strengthening physical health (Laukkanen et al., 2015; Kukkonen-Harjula et al., 1989; Laukkanen et al., 2016; Wilson,

2003), and improving the quality of life. (Schiff, Pelech, 2008; Smith, 2005; Colmant, Merta, 1998; Aung, 2006) This method has been successfully tested in social problems, alcoholism, drug addiction or as part of therapies in Canadian correctional facilities (Grobsmith and Dam, 1990; Waldram 1997; Waldram et al., 2006; Matamonasa-Bennett, 2015).

The significant role of these methods, which include sweating, increased to limiting psychophysical stress and sets of various stressors or deprivations, inducing altered states of consciousness, can also be important in the context of improving communication, professional intuition, confidence, discipline, personality integrity support or natural spiritual perception. This can be observed and traced in the traditional practices of different nations almost all over the world. (Aaland, 1978; Bruchac, 1993; Van Gennep, 1997, Eliade, 1997).

For our experiment, these aspects have a complementary character and we deliberately do not deal with them in this article. In order to be able to quantify and statistically process the results, it was necessary to deliberately narrow this range. We focused mainly on whether the effect of the methods will lead to different reactions within the psychophysical condition of individuals and cognitive performance, before and after participation for a possible comparison (Ambrozová et al., 2016).

3 Methodological approach

3.1 Diagnostic methods for design chosen abilities and competencies

To assess the effects of the development program, suitable diagnostic methods were selected. Participants' personality profiles for this experiment were not evaluated. However, in the subsequent research, this information could be important especially with regard to the temperament of the participants' personalities.

- Methods of psychophysical diagnostics
 1. Polar Team - continuous monitoring of heart rate changes and their trends. Measuring the body's response to stress stimuli.
 2. Max Pulse Medcore - plethysmographic method of examination of an individual's stress profile and diagnosis of heart rate variability.
- Methods of psychological diagnostics
 1. Numerical rectangle (CO) - non-verbal performance test of optical perception, respectively visual attention and speed. (Dolezal, Kuruc, Senka, 1992)
 2. Attention test (D2) - time-limited test of selective attention and mental concentration. (Brickenkamp, Zillmer, 2000)
 3. Disjunctive reaction time (DRČ II.) - focused on measuring perceptual alertness, speed and accuracy of reactions to visual stimuli. (Vonkomer, 1992)
 4. Decision-making in time stress (RČS) - a method mapping the complex performance of an individual in stressful conditions. (Komárková, Osecká, 1993)
 5. D48 Domino (D48) - a non-verbal intelligence test focusing on fluid intelligence - the potential ability to learn and solve problems. (Svoboda, 2010, p. 55)

3.2 Chosen statistic methods

The data were processed using cluster analysis, which deals with methods and algorithms that combine data with similar properties into a cluster. It tries to organize the obtained data into meaningful structures, about the creation of taxonomies. Cluster analysis is a data analysis tool that sorts different objects into clusters so that the similarity of two objects belonging to one group is maximum, while the similarity to objects outside this cluster is minimal. By clustering, it is possible to find relationships between objects without further explanation or interpretation. In other words, cluster analysis finds a structure between objects without explaining why they exist. (Lukasová,

Šarmanová, 1985) Cluster analysis was used in the experiment to be able to classify participants into performance-related groups.

The program was designed to identify benefits for the profession that require manager-leader attributes that appear in approximately 20% of individuals. (Ullrich, 2017 p. 63) These individuals are able to adapt to a dynamically changing environment and their body is better able to withstand fatigue, exhaustion and is able to regenerate quickly. It consisted of four steps, which are described in following items:

- Ex ante measurements to obtain input data
 1. Autonomic nervous system using Max Pulse Medcore, determining the level of physical and mental stress, the state of regeneration of the organism.
 2. Levels of mental condition (ČO, D2, DRČ II., RČS, D48).
- Sweat hut
 1. 4 cycles of psychophysical exercise after 40 minutes. At the same time, participants are affected by social deprivation, thermal discomfort, sensory deprivation at the physical, mental and emotional levels.
 2. There is a 15-minute pause between individual cycles, where the load is reduced, emotions are released (heat dissipation from the sweat hut). However, participants remain in place (do not leave the sweat hut).
 3. Continuous measurement of heart rate changes and their trends using the Polar Team.
- Controlled relaxation
 1. For a period of 30 minutes after a 30-minute break, when the participants dried themselves and prepared for relaxation. The pause also serves as a space to balance the autonomic nervous system after exercise.
 2. Participants are instructed to lie down and perceive the instructions of the guide. The goal is not to fall asleep, but to work (relax) with conscious attention. This leads to cultivation and rest on the psychophysical level of the individual.
 3. Continuous measurement of heart rate changes and their trends using the Polar Team.
- Ex post measurements to compare results
 1. Autonomic nervous system using Max Pulse Medcore, determining the level of physical and mental stress after exercise, the state of regeneration of the organism.
 2. Levels of mental condition (ČO, D2, DRČ II., RČS, D48).

4 Results

4.1 Results of heart rate measurement

Figure 1 shows a cycle of 4 rounds of load 2 of selected participants⁴, to which each reacted differently. Data were scanned using sensors monitoring the heart rate - Polar Team heart rate sensor. For a more comprehensive evaluation, it is necessary to compare the measurement of heart rate together with the personality profile of the participant and the results of psychological tests of the individual's competence in relation to the selected competencies of the manager. Furthermore, the state of the autonomic nervous system before and after exercise. Subsequently, it can be recommended appropriate methods for further development.

It is interesting that in a very short time the organism gets into a high load, when the heart rate of the participants ranged between 140 - 160 beats / min. The dotted box indicates the total length of the program. From about 19:30 there is a significant decrease in heart rate due to controlled relaxation. Whether and to what extent the organism really rests can be determined by further measurements of the autonomic nervous system using Max Pulse Medcore.

Another interesting feature is the visual comparison of the heart rate graphs in Fig. 1, while we can notice the similarity of the trend, but there are also significant differences. Each organism will react differently. In Fig. 1 it is possible to see that the trend of the load is not nearly as obvious as in Fig. 1 above. At the same time, we could argue that the participant in Fig. 1 below

had more difficulty in managing the load, because the curve is very fluctuating - out of a coherent state. When the load subsides, the organism returns very slowly to rest mode, is unable to relax and continues to become exhausted. By using the sweat hut method, it is possible to very quickly and effectively simulate the increased psychophysical burden and thus create an environment with the attributes of a crisis environment, which should be used in the preparation and development of managers and leaders.

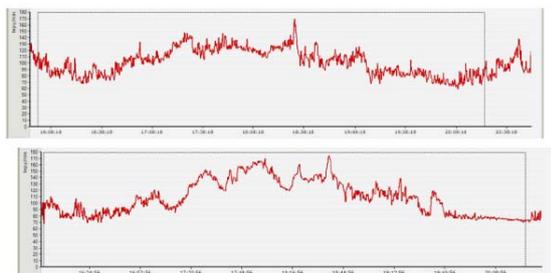


Figure 1. Comparison of the heart rate of 2 participants during the program (measured by Polar Team)

4.2 Results of measurement of the level of mental condition

Before and after the training, participants received a battery of psychological tests designed to capture the differences in the cognitive performance of individuals, which is necessary for the performance of the profession in difficult conditions. The authors focused on optical perception, attention, speed of reaction, concentration, correctness of reactions to visual stimuli or the ability to solve problems.

All 18 participants completed the tests, but the results of the 18th respondent are not complete, so this respondent is missing in the cluster analysis.

The results of measuring the level of mental condition and numerical characteristics of pre- and post-exercise performances are given in Table 1 and Table 2.

Table 1. Results of measuring mental condition

ID	Domino		RČS		D2		DRČ		ČO	
	B	A	B	A	B	A	B	A	B	A
1	30	32	18	18	193	203	36	43	18	20
2	30	31	21	23	212	172	45	42	24	0
3	37	38	23	27	132	140	40	39	20	21
4	30	32	16	17	147	156	40	42	16	22
5	30	30	24	23	189	216	49	59	18	19
6	26	29	19	19	110	138	43	42	12	19
7	24	21	11	15	121	140	28	28	15	0
8	33	35	16	19	209	188	28	29	22	24
9	31	36	20	24	203	184	54	50	18	22
10	25	24	13	17	173	169	41	52	11	12
11	26	27	14	13	122	128	24	19	15	15
12	35	41	25	25	188	196	54	59	19	23
13	21	22	17	14	141	129	50	42	15	20
14	26	24	21	18	108	141	30	28	12	16
15	30	32	13	15	166	186	43	44	18	19
16	26	18	15	18	137	143	39	17	22	21
17	32	30	17	15	128	137	30	42	16	19
18	31	30	X	X	120	145	47	52	15	22

Table 2. Descriptives of measuring mental condition

	Domino		RČS		D2	
	B	A	B	A	B	A
Mean	29.1	29.6	17.8	18.8	156	162

Median	30	30	17	18	144	151
Std. deviation	4.05	6.07	4.08	4.16	36.1	27.8
Variance	16.4	36.9	16.7	17.3	1303	775
Minimum	21	18	11	13	108	128
Maximum	37	41	25	27	212	216
	DRČ		ČO			
	B	A	B	A		
Mean	40.1	40.5	17	17.4		
Median	40.5	42	17	19.5		
Std. deviation	9.16	12.2	3.6	6.99		
Variance	83.9	149	12.9	48.9		
Minimum	24	17	11	0		
Maximum	54	59	24	24		

Source: own work by authors

The percentage point difference of the results from the measurements before and after the load is shown in Fig. No. 2.

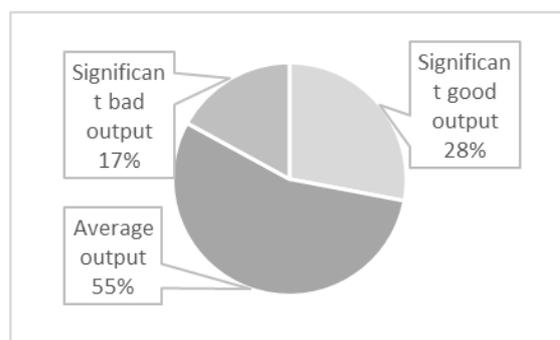


Figure 2. Results of written test: Domino, RČS, D2, DRČ, ČO

The average performance after exercise was given by 10 individuals. The average performance was considered to be the results where the overall deterioration, resp. improvement after exercise in the range from -14% to 10%. Significantly good performance after exercise was given by 5 individuals who achieved an improvement of more than 10% after exercise. Significantly poor performance after exercise was given by 3 participants who deteriorated by more than 14%.

In conclusion, it can be argued that 15 individuals out of a total of 18 were able to perform equally well or better. Using cluster analysis, it was possible to divide the participants into similar groups according to the test results. The results of the cluster analysis are shown using the Dendrogram in Figure 3.

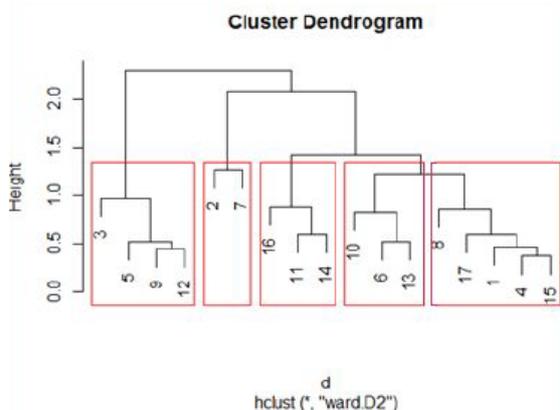


Figure 3. Cluster analysis of mental condition

- 1st group 1 (3,5,9,12)
- 1. high Domino value before and after exercise
- 2. high value of RČS before and after load
- 3. high value of D2 after load

- 2nd group (2,7) - zero points from CO.
- 3rd group (11,14,16)
 1. low Domino value after load
 2. low value of DRČ before and after load
- 4th group 4 (6,13,10)
 1. low Domino value before load
 2. low value of CO before load
- 5th group (4,15,1,17,8) - average to slightly above average values.

The results of psychological tests show that the group of participants 4, 15, 1, 17 and 8 had average to slightly above average values for all attributes. The group of respondents 3, 5, 9 and 12 had an increased value in the potential to learn and solve problems after the complex psychophysical load and shows good mental concentration.

4.3 Results of measurement of psychophysical condition

The measurement was performed at the level of the autonomic nervous system (ANS) using Max Pulse Medicore, which evaluates the stress profile of the individual using the plethysmographic method. Data were evaluated for stress scores, ANS activity, fatigue index, ANS balance, body stress, mental stress, and stress resistance. The measurement results and numerical characteristics are given in Table 3.

Table 3. Results of measuring the psychophysical condition of participants

	Stress score		ANS activity		Fatigue index	
	B	A	B	A	B	A
Mean	47.7	55.7	2.2	1.9	2.0	1.8
Median	49.0	54.0	2.0	2.1	2.0	1.8
Std. deviation	11.6	11.6	0.6	0.5	0.7	0.5
Variance	134.4	135.4	0.4	0.2	0.4	0.3
Minimum	22.0	39.0	1.1	1.0	0.6	0.6
Maximum	67.0	78.0	3.5	2.6	3.0	2.3
	Balanced ANS		Physical stress		Mental stress	
	B	A	B	A	B	A
Mean	2.2	2.1	1.4	1.8	1.2	1.5
Median	2.8	2.1	1.3	1.5	1.2	1.1
Std. deviation	0.9	0.6	0.6	0.8	0.8	0.6
Variance	0.8	0.3	0.4	0.6	0.6	0.4
Minimum	0.6	0.7	0.4	0.9	0.1	0.2
Maximum	2.9	2.8	2.5	3.4	3.2	2.4
	Endurance					
	B	A				
Mean	1.6	1.2				
Median	1.3	1.2				
Std. deviation	0.7	0.5				
Variance	0.5	0.2				
Minimum	0.6	0.2				
Maximum	3.2	1.8				

Source: own work by authors

The percentage point difference of the results from the measurements before and after the load is shown in Fig. No. 4.

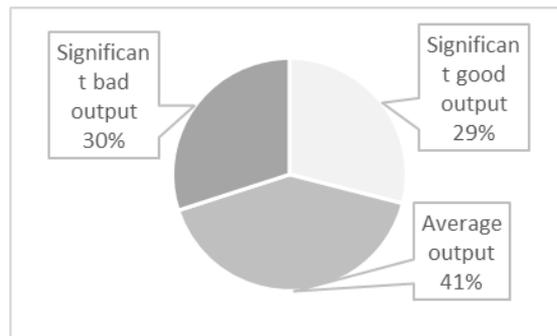


Figure 4. Results of measuring psychophysical condition level

The average performance after exercise was given by 8 individuals. The average performance was considered to be results where the overall deterioration or improvement after exercise was in the range from -55% to 4%. Significantly good performance after exercise was given by 5 individuals who achieved an improvement of more than 4% after exercise. Significantly poor performance after exercise was given by 4 participants, who deteriorated by more than 55% after exercise. Using cluster analysis, it was possible to divide the participants into similar groups according to the test results.

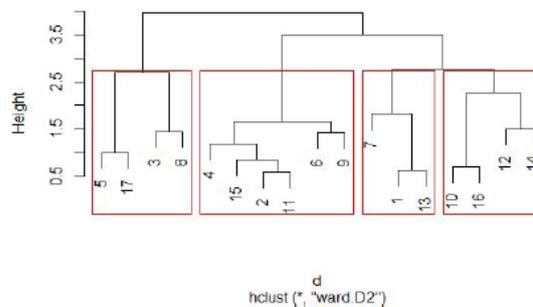


Figure 5. Cluster analysis of psychophysical condition

Breakdown of the effect of the sweat hut and relaxation into individual categories of the stress profile in relation to related groups according to the measured results:

- 1st group (5,17,3,8)
 1. high value of stress score after exercise
 2. low value of ANS activity after exercise
 3. low value of fatigue index after load
 4. high value of physical stress after exercise
 5. low value of resistance after load
- 2nd group (2,11,15,4,6,9)
 1. low pre-exercise stress score
 2. high value of fatigue index before load
 3. low value of physical stress before exercise
 4. high value of load resistance
- 3rd group (1,13,7)
 1. high value of ANS activity after exercise
 2. low value of fatigue index before load
 3. high value of fatigue index after load
 4. low value of ANS balance before load
 5. similar values of physical stress before and after exercise
 6. low value of mental stress before exercise
- 4th group (10,16,12,14)
 1. high pre-exercise stress score
 2. high value of physical stress before exercise

The decrease in the total stress score (summary indicator) occurred in group No. 4, which consisted of 4 individuals. The remaining participants had an increase in stress scores. In individuals No. 14 and 16, ANS was activated at the same time. In subjects 1, 3, 6, and 13, a significant effect was noted in the area of leveling the ANS level, ie sympathetic and parasympathetic. This is an important indicator of the psychophysical balance after the program compared to the

previous imbalance that was the baseline. Overall, there was an increase in physical stress by 21% and mental stress by 20%. This result confirms that the method is able to simulate an environment with increased psychophysical load.

5. Conclusions

The psychophysical dimension concerns the interaction of bodily and mental processes, states and phenomena. It focuses on an individual's ability to work with change, cope with workload and stress. In addition, it relates to emotional resilience, which consists, among other things, in how quickly a person can regenerate after increased stress, or agitation. The basis is continuous monitoring of changes in heart rate and their trends. At the same time, these data are monitored in situations of cognitive and mental stress, e.g. in testing attention, memory, or in situations of decision-making and acting, with the predominance of some of the modalities of stress (mainly in mental, physical, social ways).

The quantity and quality of an individual's mental performance and trend, in changing (non-standard) conditions, is also due to the ability to immerse themselves in the solution situation and to penetrate (affect) quickly and accurately the essence of the problem or task (RCS solution parameter). Also the ability to correctly apply a relatively simple algorithm over a longer period of time (solution parameter d2).

Using the sweat hut method, it is possible to very quickly and effectively simulate the increased psychophysical load and thus create an environment with attributes of the crisis environment, which can be used in the preparation and development of psychophysical condition of managers and leaders. Overall, there was an increase in physical stress by 21 % and mental stress by 20 %. Despite this, 15 participants managed to perform equally well or better in cognitive performance tests. With the help of cluster analysis, it was possible to classify participants into performance-like groups and observe detailed relationships between them. The compiled program consisting of methods of sweat hut and controlled relaxation is offered as an interesting supplement in the preparation and development of selected competencies for people moving in a demanding environment, showing increased mental and physical stress, instability of the environment and the need to solve complex, complex tasks typical of leaders, workers, managers and leaders.

Literature:

- Aaland, M. (1978): *Sweat: The illustrated history and description of the Finnish sauna, Russian bania, Islamic hammam, Japanese mushi-buro, Mexican Temescal, and American Indian & Eskimo sweat lodge*. San Bernardino (CA): Borgo Press. ISBN 0809540231
- Ambrozová, E., Koleňák, J., Ullrich, D., Pokorný, V. (2016): *Kognitivní management*. 2.vyd. Brno: Key Publishing. ISBN 978-80-7418-254-9
- Aung, S. (2006): The sweat lodge healing experience: an integrative medical perspective. *The Rose+Croix Journal*, 3, 1-27.
- Brickenkamp, R., Zillmer, E. (2000): *D2 test pozornosti*. Praha: Hogrefe-Testcentrum. ISBN 80-86471-00-4
- Bruchac, J. (1993): *The native American sweat lodge: history and legends*. Freedom, CA: Crossing Press. ISBN 089594636X
- Colmant, S. A., Merta, R. J. (1999): Using the sweat lodge ceremony as group therapy for Navajo youth. *The Journal for Specialists in Group Work*, 24(1), 55-73. 10.1080/01933929908411419
- Doležal, J., Kuruc, J., Senka, J. (1992): *Císelný obdl'žník*. Bratislava: Psychodiagnostika.
- Eliade, M. (2000): *Šamanismus a nejstarší techniky extáze*. Praha: Argo. ISBN 80-72-03-1-53-8
- Grobsmith, E. S., Dam, J. (1990): The revolving door: Substance abuse treatment and criminal sanctions for native American offenders. *Journal of Substance Abuse*, 2(4), 405-425. 10.1016/s0899-3289(12)80002-2
- Hroník, F. (2008): *Manažerská integrita*. Brno: Motiv Press. ISBN 978-80-904133-0-6.
- Kiyosaki, R. T. (2016): *8 základních lekcí vojenského výcviku pro podnikatele*. Hodkovičky: Pragma. ISBN 978-80-7349-605-0.
- Komárková, E., Osecká, L. (1993): *Rozhodování v časovém stresu*. Brno: Středisko psychologických služeb.
- Kukkonen-Harjula, K., Oja, P., Laustiola, K., Vuori, I., Jolkkonen, J., Siitonen, S., Vappatalo, H. (1989): Haemodynamics and hormonal responses to heat exposure in a Finnish sauna bath. *European Journal of Applied Physiology*, 58, 543-550. 10.1007/BF02330710
- Laukkanen, T., Khan, H., Zaccardi, F. (2015): Association between sauna bathing and fatal cardiovascular and all-cause mortality events. *JAMA Internal Medicine*. 175(4), 542-550. 10.1001/jamainternmed.2014.8187
- Laukkanen T., Kunustor, S., Kauhanen, J., Laukkanen, J. A. (2016): Sauna bathing is inversely associated with dementia and Alzheimer's disease in middle-aged Finnish men. *Age Ageing*, 46(2), 245-249. 10.1093/ageing/afw212
- Lukasová, A., Šarmanová, J. (1985): *Metody shlukové analýzy*. Praha: Státní nakladatelství technické literatury.
- Nakonečný, M. (1998): *Základy psychologie*. Praha: Academia. ISBN 80-200-0689-3.
- Robbins, S. P. Coulter, M. K. (2004). *Management*. Praha: Grada publishing, ISBN 80-247-0495-1.
- Řičan, P. (2010). *Psychologie osobnosti: obor v pohybu*. Praha: Grada publishing. ISBN 978-80-247-3133-9.
- Schiff, J., Pelech, W. (2008): The Sweat Lodge Ceremony for Spiritual Healing. *Journal of Religion & Spirituality in Social Work: Social Thought*, 26(4), 71-93. 10.1300/J377v26n04_04
- Senge, P. (2007). *Pátá disciplína: teorie a praxe učící se organizace*. Praha: Management Press. ISBN 978-80-7261-162-1.
- Smith, D., P. (2005): Sweat Lodge as Psychotherapy: Congruence between Traditional and Modern Healing. In *Integrating Traditional Healing Practices into Counseling and Psychotherapy*. United States, SAGE Publications, 196-209.
- Svoboda, M. (2010): *Psychologická diagnostika dospělých*. Praha, Portál. ISBN 978-80-7367-706-0
- Ullrich, D., Pokorný, V. (2012). The possibilities of comprehensive approach and the specifics of the training managers to fulfill tasks in the challenging environment and crisis management. In: *Recent advances in Energy, Environment and Economic Development*. France, Paris: WSEAS. ISSN 2227-4588.
- Ullrich, D. (2017): *Kompetence velitele – leadera*. Univerzita Obrany Brno, Habilitační práce.
- Van Gennep, A. (1997): *Přechodové rituály: systematické studium rituálů*. Praha, Nakladatelství Lidové noviny. ISBN 80-7106-178-6
- Vonkomer, J. (1992): *Disjunktivní reakční cas II (DRC- II)*. Bratislava: Psychodiagnostika.
- Waldram, J., B. (1997): *The way of the pipe: aboriginal spirituality and symbolic healing in Canadian prisons*. Orchard Park, NY, Broadview Press. ISBN 1551111594.
- Waldram, J., B., Herring, A., Young, T. (2006): *Aboriginal health in Canada: historical, cultural, and epidemiological perspectives*. Buffalo, University of Toronto Press. ISBN 9780802085795
- Wilson, K. (2003): Therapeutic landscapes and First Nations peoples: an exploration of culture, health and place. *Health Place*, 9(2), 83-93. 10.1016/s1353-8292(02)00016-3

Primary Paper Section: A

Secondary Paper Section: AE, ED

SALE AND VALUATION OF A PART OF A BUSINESS UNIT IN THE IDENTIFICATION OF OPERATING ASSETS

^aPETR ŠULEŘ, ^bJAKUB HORÁK, ^cZUZANA ROWLAND

^a*Institute of Technology and Business in České Budějovice, School of Expertness and Valuation, Okružní 517/10 37001 České Budějovice, Czech Republic*

^b*Institute of Technology and Business in České Budějovice, School of Expertness and Valuation, Okružní 517/10 37001 České Budějovice, Czech Republic*

^c*Institute of Technology and Business in České Budějovice, School of Expertness and Valuation, Okružní 517/10 37001 České Budějovice, Czech Republic*

email: ^apetr.suler@cezb.cz, ^bhorak@mail.vstecb.cz, ^crowland@mail.vstecb.cz

Abstract: The aim of this paper is to value a portion of a company which is able to turn a profit even after separation from the whole. The assets of the company are identified, which are operationally necessary for the further functioning of the valuated part as a separate accounting unit. The earnings and asset valuation methods are used to value the part of the company. The results of the market value of the company achieved using both methods are compared in the end and the reasons for the differences in the achieved results are stated. The difference in the results achieved by different valuation methods is due to modifications of the input data, which enter the calculation of the value of the company using the individual valuation methods used. The reason for these modifications is also explained.

Keywords: part of a business, operating assets, non-operating assets, assets of a functional accounting unit.

1 Introduction

Expertise and valuation practice is constantly dealing with the valuation of companies. Requirements for the valuation of a company are demanded primarily by the courts, which in some cases need to know the professional, impartial and factual and data-based opinion on the value of a company that is the subject of a litigation. The second group of applicants for the valuation of a company consists mainly of its owners, who need to know this information for various personal or business reasons.

In both cases, it is necessary for the appraiser to maintain an overview of the whole problem when valuing the company and to approach its solution as a third impartial rationally thinking person. Only with this approach can the best, impartial and unbiased result of a valuation be ensured.

A company can be valued as a whole, which most often occurs when it is sold. Furthermore, only certain parts of the company can be valued, which however do not form a functional unit together. These can be individual items or entire sets of tangible assets, intangible assets, movable property, etc. Last but not least, only a portion of the company can be valued. This occurs especially if the company consists of individual independently functional sub-parts (departments, divisions, etc.) and its owner or owners decide to sell this part of the company, regardless of their personal or business reasons.

The aim of this contribution is to value a separately functional part of the company, which will be able to generate a profit as a separate unit even after it has been separated (sold) from the rest of the unit. The process of valuating a self-sufficient part of a company will be demonstrated on the model company XYZ, which operates in the field of hardware, software, mobile services and internet. Specifically, it will be a valuation of the portion of the XYZ model company that provides services in the area of internet.

2 Literature research

The process of valuating the company involves the gathering of individual steps, where for each of them the maximum precision of the valuator matters. The use of these specific individual steps in the desired order is required when using a particular valuation method. Even with the right choice and use of a particular

valuation method, the valuation result may be incorrect. Audretsch and Link (2012) addressed the shortcomings of valuation methods used in valuating companies. Therefore, the use of traditional valuation methods is not recommended, especially for small businesses. Fernández (2005) has already made a list of possible errors that appraisers may make. It highlights possible errors in working with input data, errors in determining the weighted average cost of capital (WACC), errors in valuating companies that generate profit only seasonally and errors in determining the residual price of the company. Mizik and Jacobson (2009) dealt with the valuation of corporate brands using a multiplier approach. According to their findings, the assets of the valuated company do not fully participate in the result of the valuation process due to the fact that the value of the brand of the company is not taken into account among these valuated assets.

Cassia and Vismara (2009) examined the market price of a young (expanding) company if, based on an analysis of its previous financial statements, it can be determined that within 12 months the company will be able to fully cover its own operating costs, including the cost of equity. Therefore, they determined the ideal rate of growth in the value of the company, so that this situation would eventually occur safely. Therefore, they used the Logit and Cox regression models and found that the size of the deviation from the predictive value of the company has an effect on the deviation from the set time of the 12month horizon.

Classic valuation models are always based on the accounting data of the valuated company. According to Sedláček (2010), specific assets do not have to penetrate into the company's financial statements and may therefore be omitted by the appraiser during the valuation process. These are usually the intangible assets of the company. This lack of financial reporting can therefore have a very negative impact on the resulting determined value of the company. Ionita and Stoica (2009) point out the same thing. They note that the goodwill of a company is usually not visible from the customer's point of view, and therefore customers do not take this value-creating asset into account when evaluating individual companies in the decision-making process on the purchase of goods in a particular company. However, this aspect should be addressed by the appraiser.

Miciula et al. (2020) note that the valuation methods used by the valuator should be in line with the MDI-R concept, which takes into account the company's assets, its income and the company's intellectual capital, including its intangible assets. Stehel et al. (2019a) dealt with the valuation of a company's intangible assets. To value it, they used the difference between the company's final values determined using the asset and earnings methods. Abhayawansa et al. (2015) again examined what intangible assets are included in the valuation of a company and what is the justification for its inclusion in the valuation process by the appraiser. Stehel et al. (2019b) also focused on the valuation of a company's small tangible assets as part of the valuation of individual assets of the company.

The results of the valuation itself, i.e. the results of the work of the valuator, as an impartial third party, are a valuable source of information for potential investors. Kouki (2015) focused on the impact of the voluntary adoption of IFRS in the period from 2000 to 2004, when the use of IFRS was not yet mandatory, on the book value of the company from the perspective of investors. They compared GAAP as historical accounting data and accounting data maintained in accordance with the IFRS model. Determining the value of a company for the needs of investors on the basis of accounting data kept in accordance with IFRS provides more relevant data for determining the fair value of a company than GAAP.

Collewaert and Minigart (2016) examined the view of angel investors on the company they help to set up with their capital, in terms of the future value, that this angel investor will have in the future from the ownership share in the founding company, or a share in the profit. Angel investors prefer to invest in companies that are founded by intellectually gifted people. Regarding these people, investors value their intellectual capital.

Stancu et al. (2017) dealt with individual methods of company valuation and looked for differences between them. These methods were Discounted Cash Flow (DCF), Market Value Added (MVA) and Residual Income (RI). Based on the performed analysis of the comparison of individual valuation methods, no significant differences were found in the results achieved by individual methods.

Rowland et al. (2019) determined the market value of a company using a modified method of determining capitalized net income. When all the conditions for the input data are met when valuating the company using this method, they state the universal applicability of this method to determine the market value of a company from any industry.

In the case of valuation of companies operating in the information and communication (ICT) sector, the composition of their assets is very specific. This is mainly due to the relatively high share of intangible assets. Langenstein and Uzik (2015) dealt with the specifics of valuating companies operating in Germany in the ICT sector. The value of these companies ranged from one to 28 million euros. The values of the companies, based on the capital of the individual companies, ranged from two to eight million euros. However, it is necessary to use such valuation methods that take into account the intangible assets of companies operating in the ICT sector, otherwise the results are very skewed.

However, the very value of the ICT sector lies in the fact that thanks to this sector, other sectors are able to innovate in the field of ICT. Thanks to these innovations, companies operating in other sectors can also increase their value. Hidalgo and Herrera (2020) therefore analyzed how the ICT sector can contribute to the co-creation of processes carried out in other sectors. According to Barba-Sanchez et al. (2018) the performance of a company depends on the level of use and implementation of new ICT. However, companies that have already implemented these technologies in their production processes very often have to replace these technologies with new ones, because the ICT sector is a very dynamically developing sector and very often comes to the market with new technologies. Belvedere and Grano (2017) state that a company can increase its profitability by providing ICT consulting services, at least to address issues related to the services or products it provides. Jarmooka et al. (2020) dealt with the connection of ICT, knowledge management processes (KMP) and innovation. Based on the achieved results, they also state that the implementation of ICT and KMP has a positive effect on the innovative performance of a company. They therefore recommend the involvement of ICT and KMP in the company's innovation program.

The ICT sector is also specific in that it will drive business in other sectors to the next level by innovating it. It is also able to increase the competitiveness of a company by providing new and innovative technologies and participating in their implementation in other industries. However, this development also entails higher requirements for the security of IT systems (Lee and Chang, 2014).

Thanks to ICT, the Industry 4.0 program could be realized, which implements the latest technologies, especially in manufacturing companies. However, this program, which works on the basis of remote management of manufacturing processes via the internet interface, requires fast 5G data networks so that the system can quickly return information about the current state of all monitored variables. Therefore, it is essential for a company that has decided to modernize its production process

through the Industry 4.0 program to solve its internet connection and overall connectivity throughout the company very well. In this respect, ICT companies, which deal with network infrastructure solutions and the provision of internet connections (Kim, 2020), will have high demand. From this point of view, the area of the ICT sector dealing with providing internet connection and network infrastructure solutions can be considered highly lucrative in the future, and companies that already have a good client base can increase their profits. According to Tuffnell et al. (2019), revenues from artificial intelligence, the implementation of which into production processes is included in the Industry 4.0 program, will continue to rise. In 2025, artificial intelligence is expected to account for \$31,239.41 mil. in global market revenue.

A company which is operating in the ICT sector also includes tangible assets, which have the character of real estate. Before construction this construction project is necessary to develop a schedule of total costs for the construction. Beran and Hromada (2008) for this purpose, they have already published a model, which can be used to predict the expected costs and the schedule required to realize a construction project.

3 Materials and methods

The XYZ model company is run by two partners, with one of the partners participating in the operation of the valuated part of the model company by only 10 % (employee management). Furthermore, the model company XYZ employs two employees who take care of the operation of the valuated part of the subject model company XYZ. The second of the partners does not participate in the operation or management of the valuated part of the model company XYZ.

First, the identification of the accounting entries of the valuated part of the model company XYZ will be identified, which will form a separate functional part capable of generating a profit even after this division is separated from the remaining part of the model enterprise XYZ. Subsequently, an earnings valuation of this partial part of the model company XYZ will be performed. Furthermore, the asset valuation of a part of the model company XYZ will be performed. The valuation of the relevant part of the company will be performed using both valuation methods as of June 30, 2020. The achieved results of both used valuation methods will be subsequently compared.

First, the identification of accounting entries of the valuated part of the model company XYZ, which are necessary from the point of view of maintaining the future functionality of the part of the model company XYZ, will be performed. In the case of the valuated subject part of the model company XYZ, it is a set of assets including a passenger car and tangible fixed assets. In order to use the earnings method to value a part of the model company XYZ, it will be necessary to divide the used fixed assets into operating and non-operating. Subsequently, the total investment intensity of the utilized operating tangible fixed assets will be taken into account. First, however, it will be necessary to determine the size of the annual depreciation of fixed assets expressed in CZK. For this we will use formula 1.

$$\text{Annual depreciation} = \frac{\text{Purchase price}}{\text{Total service life}} \quad (1)$$

Subsequently, it will be possible to determine the degree of investment of tangible fixed assets according to formula 2.

$$\text{Investment intensity} = \frac{(\text{Purchase price} - \text{Annual depreciation})}{\text{Total service life}} \quad (2)$$

The sum of the investment intensity of all entries of tangible fixed assets will determine the total investment intensity of the valuated part of the model company XYZ.

In order to maintain the subsequent functionality of the part of the model company, it will also be necessary to determine the wage intensity of the employee who, after the separation of the valuated part, will work as one of the partners who takes care of the management of this part of the model company XYZ. The wage intensity of this employee will be determined on the basis of the median gross wage according to the CZ-ISCO classification. It will specifically be group 5 – services and sales workers. Mandatory contributions for the employee's health and social insurance, which are paid by his employer, will then be added to the median gross wage. It will therefore be necessary to increase the median gross wage by 34 % (9 % health insurance and 25 % social insurance).

Subsequently, on the basis of the provided accounting data and the values determined above, the annual deductible income of the valuated part of the model company XYZ will be calculated. Accounting data from 2017 up until the date of valuation (June 30, 2020) will be used for this purpose. Depending on the length of time from the valuation date, the weights of the results of annual deductible income will then be determined.

In the next step, the permanently deductible net income will be calculated according to formula 3.

$$TCV = \frac{\sum_{t=1}^K q_t \check{C}V_t}{\sum_{t=1}^K q_t} \quad (3)$$

Where: $\check{C}V_t$ – past adjusted net income,
 q_t – weights that determine the significance of net income for a particular prior year,
 K – number of previous years included in the calculation.

To determine the value of the subject part of the XYZ model company using the earnings valuation method, it will be necessary to determine the discount rate. The discount rate using the earnings valuation method corresponds to the alternative cost of equity (r_e). A comprehensive modular method will be used to determine alternative costs of equity, drawing on data published on the Czech market by the Ministry of Industry and Trade of the Czech Republic (MIT CR) and the Czech National Bank (CNB), which respond to the specifics of the Czech market. This will be data for the second half of 2019, as data from a period closer to the valuation date are not available. Selected according to the CZ NACE code, it will be group "J" (62 – activities in the field of information technology). The modular method for determining alternative cost of equity is set out in Formula 4.

$$r_e = r_f + r_{pod} + r_{finstab} + r_{LA} \quad (4)$$

Where: r_e – alternative cost of equity,
 r_f – risk-free yield,
 r_{pod} – risk premium for business risk,
 $r_{finstab}$ – risk premium for financial stability,
 r_{LA} – risk premium for the size of the company.

After performing these calculations, it will be possible to calculate the value of the subject part of the model company XYZ using formula 5.

$$HP = \frac{TCV}{i_k} \quad (5)$$

Where: HP – the value of the subject part of the company,
 TCV – permanently deductible net income,
 i_k – calculated interest rate.

The next step will be the valuation of the subject part of the model company XYZ using the asset valuation method. The sum of all assets of the valuated part of the model company XYZ will be performed. These will be tangible items of both operating and non-operating assets identified using the earnings valuation method. For all items, the annual wear and tear expressed in CZK will first be determined using formula 1. Subsequently, the total depreciation will be determined using formula 6.

$$Total\ depreciation = Annual\ depreciation \cdot Asset\ age \quad (6)$$

Asset age will always be rounded up in the calculations. Subsequently, the residual price of items of tangible fixed assets of the model company XYZ will be calculated using formula No. 7.

$$Residual\ price\ of\ tangible\ fixed\ assets = Purchase\ price - Total\ depreciation. \quad (7)$$

In the case of valuating a passenger car that is part of the operating assets of the valuated part of the XYZ model company, the CabiaCat GT application will be used. Tangible fixed assets will be valuated on the basis of the useful life, annual depreciation and age of the relevant assets.

Furthermore, the financial assets of the model company XYZ will be included in the valuation of the subject part of the model company XYZ using the asset valuation method. These will be residues of financial assets in the treasury and bank accounts on the valuation date. In addition, receivables will be included in the financial assets of the XYZ model company. The liabilities of the valuated XYZ model company part is the only negative item that enters the asset valuation method and will be deducted from the value of the XYZ model company part determined by the asset method.

Finally, the achieved results of both used valuation methods will be compared.

4 Results

First, the accounting entries of fixed assets of the valuated part of the model company XYZ were identified, which will form a separate functional part capable of generating profit even after the separation of this part from the remaining portion of the model company XYZ. These items are listed in Table 1, including total service life and purchase prices.

Table 1: Accounting items of the valuated part of the model company XYZ, including the total service life and purchase prices in CZK

ID	Name	Total service life / age	Purchase price
1	set of devices – internet	25 / 13.21 year	119,918.49
2	set of devices – internet	25 / 13.08 year	115,418.49
3	Server	25 / 13.04 year	91,630.00
4	set of devices – internet	25 / 12.94 year	115,683.83
5	set of devices – internet	20 / 12.73 year	206,750.90
6	Radio contact ORCAVE	20 / 11.66 year	198,000.00
7	radio contact – antenna and parabola	20 / 11.05 year	93,700.00
8	Microwave contact A-B - 1	20 / 9.62 year	21,202.25
9	Microwave contact A-B - 2	20 / 9.62 year	21,202.25
10	Microwave contact A-B - 3	20 / 9.62 year	21,202.25
11	Microwave contact A-B - 4	20 / 9.62 year	21,202.25
12	Invoice payment no. 110100523 - Server Dell	20 / 8.81 year	49,900.00
13	Microwave contact C-D	20 / 5.7 year	91,918.00
14	network construction - technical evaluation	20 / 5.66 year	130,000.00
15	Microwave contact – C-D – technical evaluation	20 / 5.18 year	90,460.00
16	Microwave contact	20 / 4.08 year	170,006.00
17	Microwave contact 2	20 / 3.66 year	179,570.00
18	Microwave contact 2	20 / 3.29 year	83,702.00
19	Microwave contact 1	20 / 3.22 year	93,004.00

20	Microwave contact 3	20 / 2.74 year	59,995.00
21	Microwave contact 4	20 / 2.62 year	79,370.00
22	Dacia Duster	15 / 2.1 year	297,190.00
Total			2,351,025.71

Source: Authors.

According to Table 1, it is evident that the identified tangible fixed assets of the valuated part of the model company XYZ have a value of CZK 2,351,025.71 based on the sum of acquisition prices.

Subsequently, these tangible fixed assets were divided into operating and non-operating. In the case of non-operating assets, it is not necessary for financial reserves to be set aside within the company for its renewal, for various reasons, depending on the nature of the specific non-operating assets. In the case of the model company XYZ, the following were included among the non-operating items of fixed assets:

1. Server (item ID 3)
2. Set of devices – internet (item ID 4)
3. Set of devices – internet (item ID 5)
4. Radio contact ORCAVE (item ID 6)

Furthermore, the annual depreciation and investment intensity of each item of operating tangible fixed assets was determined according to formulas 1 and 2. The results are shown in Table 2.

Table 2: The amount of annual depreciation and investment intensity of individual items of operating tangible fixed assets of the valuated part of the model company XYZ in CZK

ID	Name	Annual depreciation	Investment intensity
1	set of devices – internet	4,796.74	4,604.87
2	set of devices – internet	4,616.74	4,432.07
7	radio contact – antenna and parabola	4,685.00	4,450.75
8	Microwave contact A-B - 1	1,060.11	1,007.11
9	Microwave contact A-B - 2	1,060.11	1,007.11
10	Microwave contact A-B - 3	1,060.11	1,007.11
11	Microwave contact A-B - 4	1,060.11	1,007.11
12	Invoice payment No. 110100523 - Server Dell	2,495.00	2,370.25
13	Microwave contact C-D	4,595.90	4,366.11
14	network construction - technical evaluation	6,500.00	6,175.00
15	Microwave contact – C-D – technical evaluation	4,523.00	4,296.85
16	Microwave contact	8,500.30	8,075.29
17	Microwave contact 2	8,978.50	8,529.58
18	Microwave contact 2	4,185.10	3,975.85
19	Microwave contact 1	4,650.20	4,417.69
20	Microwave contact 3	2,999.75	2,849.76
21	Microwave contact 4	3,968.50	3,770.08
22	Dacia Duster	19,812.67	18,491.82
Total			84,834.38

Source: Authors.

According to Table 2, it is evident that the total annual investment intensity of the operating assets of the valuated part of the model enterprise XYZ is CZK 84,834.38.

Furthermore, the wage intensity of the employee who would have to perform managerial activities in the subject part of the model company XYZ, which is the subject of the valuation, which was up to now provided by one of the partners, was determined. Median gross wages for 2017-1. quarters of 2020 were obtained through the Information System on Average Income (www.ispv.cz). Table 3 shows the median gross wages for group 5 - services and sales workers. The values of the median gross wage need to be increased by 34 %, which corresponds to 9% for health insurance and 25 % for social insurance.

Table 3: Median gross wages for group 5 – workers in services and sales in the period 2017-1. quarter of 2020 in CZK

Year	2017	2018	2019	1. quarter 2020
Median gross wage	18,840	21,314	22,286	23,079
Median gross wage increased by compulsory contributions (+ 34%)	25,209	28,518	29,819	30,840

Source: Information system on average income (2020), authors.

Subsequently, on the basis of the provided accounting data and the results of the values determined above, the annual deductible income of the valuated part of the model company XYZ was calculated. Depending on the length of time before the valuation date, the weights of the results of annual deductible income were determined. The results of annual deductible income are shown in Table 4.

Table 4: Results of annual deductible income of the valuated part of the model company XYZ in CZK

Year	2017	2018	2019	June 30, 2020
Income	4,600,600.40	4,856,320.62	4,862,449.22	2,520,742.69
Expenditure	4,552,080.31	4,874,389.98	4,633,439.81	2,295,389.11
Of which wages	589,021.00	771,695.00	719,267.00	378,020.00
Profit	48,520.09	-18,069.36	229,009.41	225,353.58
Median gross wage plus compulsory contributions	25,209.00	28,518.00	29,819.00	30,840.00
Annual salary	302,508.00	342,216.00	357,828.00	185,040.00
Share of cooperation	10 %	10 %	10 %	10 %
Salary depending on the share of cooperation	30,250.80	34,221.60	35,782.80	18,504.00
Profit before tax	18,269.29	-52,290.96	193,226.61	206,849.58
Tax 15 % (FO)	2,740.39	0.00	28,983.99	31,027.44
Investment intensity	84,800.00	84,800.00	84,800.00	84,800.00
Net deductible annual income	-69,271.10	-137,090.96	79,442.62	91,022.14
Weight	1	2	3	4

Source: Authors.

The permanently deductible net income has now been calculated according to formula 3.

$$TCV = \frac{1 * (-69,271.10 \text{ CZK}) + 2 * (-137,090.96 \text{ CZK}) + 3 * 79,422.62 \text{ CZK} + 4 * 91,022.14 \text{ CZK}}{1 + 2 + 3 + 4}$$

$$TCV = 62,305.20 \text{ CZK.}$$

Permanently net deductible income was calculated at CZK 62,305.20 using formula 3.

In the next step, a discount rate was determined, which corresponds to the alternative cost of equity (r_e) when using the earnings valuation method. First, the risk-free earnings (r_f), which corresponds to the yield on a ten-year government bond, was obtained through the ARAD (CNB) time series database. At the valuation date, the value of the ten-year government bond yield was 0.86 % (CNB, 2021). The values of the risk premium for business risk (r_{pod}), risk premium for financial stability ($r_{finstab}$) and risk premium for the size of the company (r_{LA}) were obtained through the Ministry of Industry and Trade of the Czech Republic. Table 5 shows the values of the risk premium for business risk (r_{pod}), risk premium for financial stability

($r_{finstab}$) and risk premium for the size of the company (r_{LA}) for 2019.

Table 5: Values of risk premium for business risk (r_{pod}), risk premium for financial stability ($r_{finstab}$) and risk premium for company size (r_{LA}) for 2019

Risk premium for business risk (r_{pod})	2.92 %
Risk surcharge for financial stability ($r_{finstab}$)	0.57 %
Risk premium for company size (r_{LA})	1.69 %

Source: MPO ČR, 2020.

The values of risk premiums for 2020 were not yet available at the date of valuation of the valuated part of the model company XYZ, and therefore the values of risk premiums from 2019 were used. At this point, the amount of alternative cost of equity was calculated according to formula 4.

$$r_e = 0.86 \% + 2.92 \% + 0.57 \% + 1.69 \%$$

$$r_e = 6.04 \%$$

The calculated interest rate of alternative costs for equity for the valuation of the subject part of the model company XYZ using the income method was determined at 6.04 %.

It is now possible to calculate the value of the subject part of the model company XYZ using the earnings valuation method according to formula 5.

$$HP = \frac{62,305.20 \text{ CZK}}{6.04 \%}$$

$$HP = 1,031,543 \text{ CZK}$$

The market value of the subject part of the model company XYZ was set at CZK 1,031,543 using the earnings valuation method. Then, the subject part of the model company XYZ was valued using the asset valuation method. In the case of using the property valuation method, it was first necessary to determine the asset value of the identified operating and non-operating assets of the subject part of the model company XYZ. Table 6 shows the achieved results of total depreciation and residual prices of tangible fixed assets determined according to formulas 6 and 7. The passenger car (item ID 22) was not included in the calculation and is valued in the next section.

Table 6: Total depreciation and residual value of tangible fixed assets in CZK

ID	Name	Asset age	Total depreciation	Residual value
1	set of devices – internet	14 years	67,154.35	52,764.14
2	set of devices – internet	14 years	64,634.35	50,784.14
3	Server	14 years	51,312.80	40,317.20
4	set of devices – internet	13 years	60,155.59	55,528.24
5	set of devices – internet	13 years	134,388.09	72,362.82
6	Radio contact ORCAVE	12 years	118,800.00	79,200.00
7	radio contact – antenna and parabola	12 years	56,220.00	37,480.00
8	Microwave contact A-B - No.1	10 years	10,601.13	10,601.13
9	Microwave contact A-B - No.2	10 years	10,601.13	10,601.13
10	Microwave contact A-B - No.3	10 years	10,601.13	10,601.13
11	Microwave contact A-B - No.4	10 years	10,601.13	10,601.13
12	Invoice payment No. 110100523 - Server Dell	9 years	22,455.00	27,445.00
13	Microwave contact	6 years	27,575.40	64,342.60

	C-D			
14	network construction - technical evaluation	6 years	39,000.00	91,000.00
15	Microwave contact - C-D - technical evaluation	6 years	27,138.00	63,322.00
16	Microwave contact	5 years	42,501.50	127,504.50
17	Microwave contact 2	4 years	35,914.00	143,656.00
18	Microwave contact 2	4 years	16,740.40	66,961.60
19	Microwave contact 1	4 years	18,600.80	74,403.20
20	Microwave contact 3	3 years	8,999.25	50,995.75
21	Microwave contact 4	3 years	11,905.50	67,464.50
Total				1,207,936.17

Source: Authors.

Tangible fixed assets are valued using the asset valuation method in the amount of CZK 1,207,936.17.

The car (item ID 22) was valued using the CebiaCat GT application. It was based on the type designation of the vehicle, the level of equipment, age and mileage at the date of the valuation. The car was valued at CZK 206,694 using the CebiaCat GT application. This amount therefore enters into the valuation of the subject part of the model company XYZ using the property valuation method.

Based on other provided accounting data of the subject part of the valuated model company XYZ, no current assets were identified and thus this part of the assets of the company XYZ does not enter into the valuation process using the property valuation method. Furthermore, financial assets in the total amount of CZK 199,183.10 were identified. These financial assets of the model company consisted of its receivables and cash in a bank account. Receivables from XYZ amounted to CZK 150,341 as of the valuation date and the current account balance was CZK 48,842.10 as of the valuation date. The borrowed capital of XYZ was also determined in the form of outstanding liabilities in the total amount of CZK 467,468.45. These liabilities were deducted from the asset value of the valuated company XYZ. Table 7 shows the calculation of the value of the valuated company XYZ using the asset valuation method.

Table 7: Valuation of XYZ using the asset valuation method in CZK

	Entry	Value
Fixed assets	Passenger car	206,694.00
	Other fixed tangible assets	1,207,936.17
Financial assets	Receivables	150,341.00
	Cash – Bank Account	48,842.10
Borrowed capital	Liabilities (-)	-467,468.45
Total		1,146,134.65

Source: Author.

The valuated subject of the model company XYZ was valued at CZK 1,146,134.65 using the assets valuation method.

5 Discussion

Different valuation methods can be used in different cases. Their choice always depends on the nature of the valuation's objective. For the valuation of companies that meet the condition of going concern, the earnings valuation method can be used and its use is logically justified. Asset valuation methods can be used to

value companies that no longer meet the going concern condition. The property valuation method is thus more often used by companies that need to be valued due to their liquidation, etc. In the model case of valuing a part of the company XYZ, both valuation methods were used, but each time with minor modifications of the input data. In the case of the earnings valuation method, tangible fixed assets were included in the valuation calculation in amounts determined on the basis of the investment intensity of individual items of tangible fixed assets. However, in the case of four items, their future renewal was not expected due to the nature of these assets, and thus these items did not enter the calculation of the valuation using the earnings method at all. In the case of using the asset valuation method, on the other hand, these four mentioned items of tangible fixed assets were included in the valuation, because at the valuation date these items were part of assets that the valuated part of the model company XYZ actually physically owned and used for its activities. This will be the case until the end of service life of these assets. The given difference in the results achieved by both used valuation methods of CZK 114,591.65 could therefore be caused due to these stated and justified facts. It is also necessary to mention that in the case of valuation of the subject of valuation by the valuator, as an impartial independent rational person, the determined market value is always an estimate of the market price. However, the difference between this estimate and the final reality is minimized by the error-free use of all valuation methods utilized in a particular case. This difference can also be justified by the fact that the use of statistical methods also results in accuracy, which depends on the level of probability of achieving the calculated result. This is usually a 95% level of probability, which corresponds to a difference of +/- 5% of the deviation of the established market price in the valuation and the final price.

The valuated part of the XYZ model company also does not have significant intangible assets related to the business (brand, etc.), nor does active marketing lead to the expansion of the customer base. If this were to happen, it would be able to collect higher profits only on the basis of the provision of internet connection and would not have to further invest in expanding the infrastructure of internet connection provision to gain new customers (access points).

6 Conclusion

The aim of the paper was to value a part of a company, which includes a set of all types of assets that the valuated part of the company uses for its activities. The valuation of this set was demonstrated on the example of the model company XYZ, which operates in the field of ICT. Specifically, it was a part of the company that provided internet connection services. Here, the specifics that are typical for this type of activity were identified and taken into account.

Subsequently, specific asset items of the valuated part of the model company XYZ were identified. The part of the model company XYZ was subsequently valued using a selected earnings valuation method and subsequently also according to a selected asset valuation method.

The aim of the paper was thus met. Future research could focus on methods of identifying a set of operating and non-operating assets when valuating a portion of a company operating in other sectors.

Literature:

1. Abhayawansa, S., Aleksanyan, M., Bahtsevanoglou, J.: The use of intellectual capital information by sell-side analysts in company valuation. *Accounting and Business Research*. 2015, 45(3), 279-306 p. ISSN 0001-4788.
2. Audretsch, D. B., Link, A. N.: Valuing an entrepreneurial enterprise. *Small Business Economics*. 2012, 38(2), 139-145 p. ISSN 0921-898X.
3. Barba-Sanchez, V., Calderon-Milan, M., Atienza-Sahuquillo, C.: A Study of the Value of ICT in Improving Corporate Performance: A Corporate Competitiveness View.

- Technological and Economic Development of Economy*. 2018, 24(4), 1388-1407 p. ISSN 2029-4913.
4. Belvedere, V., Grano, A.: ICT-enabled time performance: an investigation of value creation mechanisms. *Production Planning & Control*. 2017, 28(1), 75-88 p. ISSN 0953-7287.
5. Beran, V., Hromada, E.: Dynamic Simulations in Cost and Time Estimation of the Construction Process. *Acta Polytechnica*. 2008, 48(1), 30-35 p. ISSN 1210-2709.
6. Cassia, L., Vismara, S.: Valuation Accuracy and Infinity Horizon Forecast: Empirical Evidence from Europe. *Journal of International Financial Management & Accounting*. 2009, 20(2), 135-165 p. ISSN 0954-1314.
7. Česká národní banka: Výnos desetiletých státních dluhopisů [Czech national bank: 10-year maturity Treasury bond yield] [online]. 2021. Available at: https://www.cnb.cz/cnb/stat.ARA_DY_PKG.PARAMETRY_SESTAVY?p_strid=AEBA&p_sestuid=375&p_lang=CS (online: 18.2.2021)
8. Collewart, V., Manigart, S.: Valuation of Angel-Backed Companies: The Role of Investor Human Capital. *Journal of Small Business Management*. 2016, 54(1), 356-372 p. ISSN 0047-2778.
9. Fernández, P.: Most common errors in company valuation. *Investment Management and Financial Innovations*. 2005, 2(2), 128-141 p. ISSN 1810-4967.
10. Hidalgo, A., Herrera, R.: Innovation management and co-creation in KIBs: An approach to the ICT services sector. *Technological Forecasting and Social Change*. 2020, 161, Art. No. 120278. ISSN 0040-1625.
11. Informační systém o průměrném výdělků: Čtvrtletní výsledky – 1. čtvrtletí 2020: ČR celkem [Average earnings information system: Quarterly results – 1. Quarter 2020: CR total] [online]. v2020. Available at: <https://www.ispv.cz/Vysledy-setreni/Archiv/2020.aspx> (online: 18.2.2021)
12. Ionita, I., Stoica, M.: A New Approach Method of Company Valuation. *Romanian Journal of Economic Forecasting*. 2009, 10(1), 115-122 p. ISSN 1582-6163.
13. Jarmooka, Q., Fulford, R. G., Morris, R., Barratt-Pugh, L.: The mapping of information and communication technologies, and knowledge management processes, with company innovation. *Journal of Knowledge Management*. 2020, [Early Access]. ISSN 1367-3270.
14. Kim, D.: A 2020 perspective on "A dynamic model for the evolution of the next generation Internet - Implications for network policies": Towards a balanced perspective on the Internet's role in the 5G and Industry 4.0 era. *Electronic Commerce Research and Applications*. 2020, 41, Art. No. 100966. ISSN 1567-4223.
15. Kouki, A.: Accounting valuation models under international financial reporting standards: Evidence from some European listed companies. *International Journal of Managerial and Financial Accounting*. 2015, 7(1), 82-101 p. ISSN 1753-6715.
16. Langenstein, T., Uzik, M.: *Specifics of Company Valuation of IT Companies*. In: Gavurova, B., Soltes, M. (Eds.) Central European Conference in Finance and Economics (CEE2015). Herlany, Slovakia, 2015, 347-356 p. ISBN 978-80-553-2467-8.
17. Lee, C. M., Chang, H.: A study on security strategy in ICT convergence environment. *Journal of Supercomputing*. 2014, 70(1), 211-223 p. ISSN 0920-8542.
18. Miciula, I., Kadlubek, M., Stepien, P.: Modern Methods of Business Valuation-Case Study and New Concepts. *Sustainability*. 2020, 12(7), Art. No. 2699. ISSN 2071-1050.
19. Mizik, N., Jacobson, R.: Valuing Branded Businesses. *Journal of Marketing*. 2009, 73(6), 137-153 p. ISSN 0022-2429.
20. Rowland, Z., Machová, V., Horák, J., Hejda, J.: Determining the Market Value of the Enterprise Using the Modified Method of Capitalized Net Incomes and Metfessel Allocation of Input Data. *Ad Alta-Journal of Interdisciplinary Research*. 2019, 9(2), 305-310 p. ISSN 1804-7890.
21. Sedláček, J.: Analysis of the Development of Intangible Assets in the Czech Enterprises and their Impact on Financial Position and Performance. *Ekonomický Časopis*. 2010, 58(4), 375-391 p. ISSN 0013-3035.
22. Stancu, I., Obrebrașoveanu, L., Ciobanu, A., Stancu, A. T.: Are company valuation models the same? – A comparative analysis between the discounted cash flows (DCF), the adjusted net asset, value and price multiples, the market value added

(MVA) and the residual income (RI) models. *Economic Computation and Economic Cybernetics Studies and Research*. 2017, 51(3), 5-20 p. ISSN 0424-267X.

23. Stehel, V., Hejda, J., Vochozka, M.: Use of Objectivized Value in Business Valuation. *Ad Alta-Journal of Interdisciplinary Research*. 2019b, 9(2), 333-338 p. ISSN 1804-7890.

24. Stehel, V., Rowland, Z., Mareček, J.: Valuation of Intangible Assets Deposit into Capital Company in Case of Specific Transaction. *Ad Alta-Journal of Interdisciplinary Research*. 2019a, 9(1), 287-291 p. ISSN 1804-7890.

25. Tuffnell, C., Král, P., Durana, P., Krulický, T.: Industry 4.0-based manufacturing systems: Smart production, sustainable supply chain networks, and real-time process monitoring. *Journal of Self-Governance and Management Economics*. 2019, 7(2), 7-12 p. ISSN 2329-4175.

Primary Paper Section: A

Secondary Paper Section: AE, AH

INFLUENCE OF THE CORONAVIRUS PANDEMIC ON SOCIAL PROCESSES IN RUSSIA

^aGENNADI B. PRONCHEV, ^bVALENTINA A. SUSHKO

Lomonosov Moscow State University, Leninskie gory str., 1, Moscow, Russia
 email: ^apronchev@rambler.ru, ^bvalentina.sushko@gmail.com

Abstract: This article is devoted to the main socio-economic consequences of the coronavirus pandemic in the world and in Russia. The new COVID-19 coronavirus infection, which has infected more than 36 million people worldwide since December 2019 (data as of October 20, 2020), not only caused chaos in economics and collapse of social activity (due to widespread quarantine or, as in Russia, voluntary lockdown). It became a catalyst for technological changes that can stay with us for a long time even after the creation of a medicine or vaccine. Robotic dogs on guard of public health are only one of the signs of the new time, which are already visible in various areas of human life. Initially, the article focuses on the economic consequences of a viral infection. Its influence on migration and demographic consequences is considered. Its influence on the subsequent state of health is also traced. The authors analyzed the impact of the coronavirus epidemic on the prospects for labor force development and employment.

Keywords: coronavirus infection, socio-economic consequences, economics and epidemic, migration and epidemic, health and epidemic, employment.

1 Introduction

The consequences of the coronavirus pandemic will have a fundamental impact on the economic, political and social spheres of our society. The coronavirus epidemic has revealed specific and general problems of the Russian state and the global society as a whole. It sent a long-unseen challenge, burdening the entire social system with a variety of difficulties from problems associated with physical diseases to problems associated with social and economic development. No one knows how long the outbreak of the new coronavirus will last and what countries will be most affected by it, how many people will become infected, and how many lives this disease will take on a global scale. But the likely economic, political and social consequences of the current pandemic are already demonstrating their essence. More and more scientists and experts are expressing the opinion that humanity has entered a new stage in the formation of the world order.

What will become a society in Russia? Will there be a modernization shift in basic values after the fight against coronavirus in the world comes to an end? Will they become more liberal or more conservative? In our opinion, this depends on a comparison of the course and results of the struggle against the pandemic in the USA, European countries and in Russia. The impressions of Russian citizens are formed on the basis of statistical data, evidence of experts (both Russian and foreign) about the state of affairs in the fight against coronavirus and the reasons for the disastrous state of citizens in these countries (Averin & Sushko, 2020).

2 Literature Review

From an economic point of view, the negative impact of the coronavirus epidemic is measured not only by the number of people infected and sick, but also by the economic consequences that have arisen in connection with it (2). Thus, the coronavirus affected all global markets, which led to a drop in stock prices and bond yields.

In addition, this epidemic has led large institutions and banks to lower their forecasts for global economic growth. Thus, The European Commission has lowered its forecast for the global economic downturn due to the COVID-19 pandemic in 2020 to 3.8%. The EC also lowered expectations of economic recovery in 2021 to 4.7%. In the spring, a decline of 2.9% in 2020 and a subsequent recovery of 5% in 2021 were forecast (Burns, 2020). The epidemic had a negative impact on the service sector, retail trade, tourism, and brought sharp restrictions on various types of transportation, which could not but affect the economics and business in many countries. The consumer market has been significantly reduced.

The contraction in manufacturing activity has led to a decrease in oil demand and prices. The spread of COVID-19 has worsened investor sentiment, leading to a lowering of the share prices in major markets.

The epidemic has led to a reduction in the tourism industry. Due to the lack of foreign tourists, Russian business missed 600 billion rubles in January - October 2020. In the summer, the head of the Federal tourism Agency estimated the total losses of the industry at 1.5 trillion rubles (Doguzova, 2020). Restrictions on people's movement and travel cancellation both in the business and entertainment sectors have become noticeable due to the population's fear of illness and the inability to return to their business.

As for the impact of the coronavirus epidemic on the Russian economy, the following can be noted: the country will overcome the economic consequences, according to experts, from 1 to 4 years (Business, 2020). This, of course, is not yet an economic recession, but without the mobilization efforts of management at all levels, these difficulties cannot be overcome.

In the struggle for the lives of people, it was necessary to sacrifice the service sector, mostly small and medium-sized businesses, to suspend the activities of clinics, kindergartens, schools, universities, libraries, sports centers, and entertainment facilities.

In addition, it was necessary to establish a strict regime of self-restraint and personal hygiene, which limited a person's ability to move, which, naturally, could not improve the well-being of an ordinary person and could lead to an exacerbation of coexisting and chronic diseases, that is, to a deterioration in person's health (Caduff, 2020).

In the area of attitude to hydrocarbons, Russia did not stand aside from global trends: their overproduction, coupled with rising prices for them, could not but affect the deterioration of the economic situation in general, and a decrease in the country's export potential. In these conditions, additional efforts are required to stimulate the production and consumption of goods and services within the country under special conditions of decreasing demand for them. Apparently (and this is already clear), it will be necessary to significantly change supply chains in distribution cycles, change people's attitudes towards redistribution processes (Burns, 2020).

Another economic problem in connection with the coronavirus is related to the loss of income of the population due to partial or complete loss of work (Sadiq, 2020). The accumulated funds are not enough, and the credit funds are no longer affordable. The role of the state is also insufficient, although in these conditions it provided all possible assistance.

Now, not only the low-income people and pensioners are forced to be in the regime of saving, but also a significant part of the so-called middle class, which, like everyone else, concentrated its resources on the purpose of primary consumption, practically not investing them in industrial investment, including the construction market, production of finishing materials, furniture.

The crisis also gave rise to migration problems, especially in large agglomerations (Pronchev et al., 2019). So, for example, Moscow, being the largest of them with 160 nationalities living in it, became the first city in Russia that was attacked by the coronavirus both in the number of infected and in the number of deaths, began to lose migrants, both due to the termination of transport links and due to panic reactions from guests and employees of the capital during the winter and spring of 2020.

Another problem associated with the epidemic is the outflow of migrants from the economic space of Russia. The net outflow of

migrants from abroad in January-August 2020 decreased by 2.4 times, to 69.1 thousand people, compared to 166.7 thousand for the same period a year earlier in Russia (Rosstat, 2020). Most often, these people were employed in the service and trade sectors. Their departure led to a decrease in demand for rent and credit loans.

The health and beauty industry has also suffered. Every tenth beauty salon and every fifth fitness club in Russia did not survive the pandemic (Kolganov & Reprintseva, 2020).

Today it is rather difficult to name the ways to overcome the risks in each of these sectors since it is rather difficult to determine the end of the epidemic. It can last and change.

Moreover, restrictive measures cannot have an immediate effect when a large part of the economy is in a state of collapse. If the authors are not talking about complete stagnation yet, then the world and Russian economic crisis testifies to its long-term nature.

At the same time, practice shows that preventive measures in Russia as a whole turned out to be the most effective in the world, where the population was able to develop the so-called "collective immunity" and localize morbidity by age composition, climatic peculiarities and other factors.

It remains to be hoped that the correct social and economic policy of the state will make it possible to compensate for the physical and social losses of the population in the shortest possible time.

Let us consider the negative impact of the coronavirus pandemic on demographic processes. As a result of this impact, Russia will face another dip in the number of births, the depth of which will depend on the duration and severity of the crisis. Demographers from the Russian Academy of National Economy and Public Administration (RANEPA) warn about this (Makarentseva & Khasanova, 2020). They note that the experience of previous epidemics has shown that after them there is a "pause in pregnancies": the number of births is reduced by 15-25% of the average monthly rate. The results of this trend will depend on the pace and nature of economic development (Makarentseva & Khasanova, 2020).

It is also noted that during 2017-2019, a difficult demographic situation was recorded in Russia, "caused by natural population decline, which was not compensated by the migration inflow," as evidenced by Federal State Statistics Service data. In 2019, the number of births in the Russian Federation was 12% lower than in 2017. "In Russia, the natural population decline in 2019 was 316 thousand people. For almost the entire 11-year period (from 2008 to 2019), the mortality rate in Russia exceeded the birth rate" (Makarentseva & Khasanova, 2020).

Now, due to the consequences of the pandemic, the problems are getting more complicated. "The current socio-epidemiological crisis will have a predominantly negative impact on the reproductive behavior of the population due to social stress (psychological depression caused by a large number of deaths; negative economic expectations) and the concomitant general economic crisis (losses in household income; probable losses in the labor market)" (Makarentseva & Khasanova, 2020).

These experts reported that the demographic collapse in Russia can be expected from December 2020 to at least February 2021. The magnitude of the gap will be influenced by the scale of the spread of the disease, the total number of deaths. A slight decrease in the number of abortions can be expected in 2020, since the termination of pregnancies that occurred in the months preceding March and April should be difficult in an environment of quarantine and an increased burden on medical institutions, which, oddly enough, may ultimately lead to an increase in the birth rate (Makarentseva & Khasanova, 2020).

Yet, the main factors in determining the future of demography will not be quarantine measures, but measures aimed at

economic assistance to the family (maternity capital, one-time payments to large families, families giving birth to the first child, and other types of assistance).

The strict regime of lockdown and quarantine was a restraining factor in demographic behavior. These measures have led to a decrease in the quality of life (Sushko et al., 2016): the time for various leisure activities has decreased, the time spent in open space has decreased, and there have been significant restrictions on travel. In addition, this temporary lockdown limited the possibilities for additional education, maintaining the state of health at an appropriate level, transferring the treatment of traditional diseases to a later period, and more.

There are also positive aspects in self-restraint and the transition to remote methods of work: a person is forced to stay in the family more, thereby making up for the lack of communication with close people, forcing a person to think about subsequent demographic efforts.

However, one should understand the following: the introduction of restrictions introduced in many countries does not mean the end of the epidemic. The final victory over the pandemic is possible only with the help of competent sanitary and epidemiological work, human compliance with strict instructions, efforts of the government and society as a whole in understanding the insidiousness of this disease.

Let us consider a number of issues of the negative impact of the coronavirus epidemic on human health.

The very fact of being infected with coronavirus reduces the body's threshold capabilities in the fight against this disease (Sadiq, 2020). The main problem in this case is that the human immune system, without special means, is able to fight this infection, since effective vaccine formulations have not yet been developed that can prove their effectiveness and harmlessness to the body.

In the most favorable conditions, there are people whose immune system begins to produce antibodies necessary to block the virus and can save a person from the disease. Such people, perhaps, will be spared from reinfection. However, this is only a slight consolation since the problem of virus mutation remains open.

According to experts, the main consequence that those who have recovered will meet is breathing problems (Lescure et al., 2020). Such patients require additional therapeutic rehabilitation in the form of aerobic exercises aimed at strengthening the cardiovascular system. Swimming can be a good method as well.

Another consequence of this infection can be pulmonary fibrosis (Senkalfa et al., 2020) (known in print media as the "frosted glass effect"), which means the overgrowth of scar tissue and prevents oxygen from entering the bloodstream, accompanied by severe shortness of breath, coughing and dizziness.

The next consequence is brain damage: young people who have undergone the disease often complain of fatigue, dizziness, and the elderly - of disorientation in space and confusion. The infection can cause the death of entire areas of the brain. In older people, it can trigger heart attacks, strokes, and meningitis (Kumar et al., 2020).

Let us dwell on the impact of the coronavirus epidemic on the employment of workers and the employer's attitude to the organization of employees' work. Let us start with the latter, precisely on the role of the employer in organizing work during the epidemic.

The Consultant Plus website (<http://www.consultant.ru/>) contains a "Guide to HR issues. Obligations of the employer in case of epidemics" (Consultant Plus, 2020), which proposes to carry out the following measures:

- to develop and adopt local regulations regarding the organization of labor processes during the outbreak of coronavirus;
- to take measures to prevent coronavirus in the organization;
- to take measures to limit contact with workers returning from countries unfavorable in terms of COVID-19. The head needs to issue an order to prevent the spread of COVID-19 and familiarize all employees with it. The order should set out the measures for the prevention of coronavirus infection that will be carried out in the organization.

Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (<https://www.rospotrebнадзор.ru>) offered employers the following preventive measures:

- place hand sanitizers at the entrance to the organization;
- to ensure the measurement of the body temperature of workers at the beginning and during the working day;
- suspension of workers from being at the workplace if they have an increased temperature and signs of an infectious disease;
- to ensure control of the doctor's call to sick workers at home;
- to ensure control of compliance with lockdown of workers at home for a specified period 14 days when returning from countries where cases of COVID-19 have been registered;
- to inform employees about the need to comply with the rules of personal and public hygiene;
- to provide regular and high-quality cleaning of premises with the use of disinfectants in especially polluted places;
- to ensure that organizations have at least a five-day supply of disinfectants for cleaning premises and treating the hands of workers, as well as the availability of masks and respirators in case of detection of infection;
- to ventilate the premises, ensure air disinfection using germicidal lamps.

Limit:

- internal corporate and public events;
- business trips of employees to other countries or cities;
- when planning vacations, refrain from visiting countries where cases of COVID-19 are recorded.

Additional measures:

- transfer to remote work employees, whose job responsibilities allow to do this.

By the way, on June 17, 2020, a bill was sent to the State Duma of the Russian Federation (amendments to the Labor Code of the Russian Federation) on the need to legalize remote work, even after the end of the epidemic, with full salary preservation (Bill, 2020). Let us mention that if an employee who is on "remote work" gets into an accident, the employer will be obliged to organize an investigation in accordance with Article 312.3 of the Labor Code of the Russian Federation.

It is necessary to consider the legal responsibility for the spread of COVID-19. So, in accordance with Art. 236 of the Criminal Code of the Russian Federation violation of sanitary and epidemiological rules involves liability.

If through the fault of the employee (through negligence) people become infected, then he/she may face one of the following punishments (Criminal code, 1996):

- a fine up to 1 thousand USA dollars;
- a fine in the amount of 6 months' wages;
- deprivation of the right to hold certain positions;
- deprivation of the right to engage in certain activities for up to 3 years;
- obligatory work for up to 360 hours;
- corrective work for up to one year;

- imprisonment for up to one year.

If a violation of sanitary and epidemiological rules has resulted in the death of a person (by negligence), then the employee faces:

- obligatory work for up to 480 hours;
- corrective work for a period of 6 months to two years;
- compulsory work for up to 480 hours;
- imprisonment for up to 5 years.

These are the basic rules for dealing with the coronavirus epidemic and sanctions for misconduct. Further, the article will consider what the labor market will be like after the epidemic.

It is believed that the coronavirus epidemic could cost several million Russians jobs. The labor market situation is constantly changing. The "remote" mode can seriously hit the economy of both the state and the individuals. This regime leads to a forced slowdown in the mobility of the employed population and its business activity.

According to experts (Banks today, 2020), when the crisis is over, it will turn out that:

- there are too many couriers in the country, which will be less and less in demand;
- some people who were fired from the tourism industry during the crisis will find a new job, but in the industries most affected by the virus it is unlikely that there will soon be a shortage of personnel;
- the number of open positions, in general, will be less due to the ruin of small individual entrepreneurs and small businesses, and entrepreneurs themselves can join the ranks of the unemployed.

According to HR specialist Yulia Belousova, if the crisis caused by the coronavirus does not end by the end of 2020, it will cause even more serious crisis in the labor market: "Changes in the labor market will depend on the continuation of quarantine and the ability of enterprises to restore their capacities as soon as possible" (Banks today, 2020). Traditionally, in August-September, open positions are closed faster due to the graduation of young people from educational institutions. During these months, the values of unemployment are the highest, if the crisis does not subside.

Most likely, the demand for workers in the commercial sector, retail, and tourism industry will decrease. This will be related to the rate of recovery of the purchasing power of the population. Another expert, Tatiana Dolyakova, believes that now companies are trying to transfer everyone to the "remote work". Until recently, it was the peculiarity of IT specialists, designers, marketers. After the crisis, the number of remote specialists can reach 60%. This is the first thing. Secondly, despite the jump in inflation, employees in these difficult economic conditions should not expect an increase in wages (which was planned by half of the employers at the beginning of 2020) until the end of the year. The main thing for employees will be the desire to stay in their places. It is also necessary to mention the possible professions that will appear or become consolidated after the epidemic (Banks today, 2020).

They will change or modify workflows (Banks today, 2020):

- digital curator - a specialist in the field of digital technologies such as online banking, telemedicine, marketing engineer;
- the organizer of virtual business tours - someone who will be a specialist in the presentation of new business products;
- online business process organizer - offers to purchase any business product.

It can be assumed that the professions associated with the promotion of goods to the market, as well as many engineering and construction professions will remain popular; tourism

professions, professions related to logistics, digital technologies and others will be restored to their rights. People should spend their free time either on advanced training or on acquiring a new profession.

3 Research Methodological Framework

To study the opinion on the impact of the coronavirus epidemic on social processes in Russia, an online questionnaire survey of the population of Moscow and the Moscow region was conducted in 2020. The sampled population was formed by gender, age and education. The sampled population size was 500 people, which ensured the representativeness of the research results to the population aged 18 and over by sex, age, education with tolerance of $\pm 4\%$. The questionnaire used three blocks of questions in their instrumental expression. The first block consisted of questions related to the study of respondents' opinions on the impact of the coronavirus epidemic on the spheres of modern society and citizens' opinions on how our society will develop; the second block consists of questions related to the assessment of measures taken in the fight against coronavirus infection and actions taken by the respondents themselves; the third block of questions relates to the socio-demographic, socio-educational and socio-territorial situation of the population of Russia.

4 Results and Discussion

According to the results of our study, 89% were informed about the pandemic more than enough, 11% said they were informed about the pandemic, but would like to know some information in more detail, in particular the consequences of coronavirus infection on health in the future. Among the age groups of respondents, schoolchildren showed the worst awareness (6%), almost the same number (5%) was for the informed pensioners.

The majority of Russians (81%) agreed that the impact of the coronavirus pandemic on Russian society would be as negative as possible. The respondents indicate that the negative impact of the pandemic will affect all sectors, in particular public catering and trade (68%), recreation and tourism (59%), services and entertainment, in particular sports and the beauty industry (53%). The majority of respondents are pessimistic about the prospects for normalizing the situation in all sectors. Almost half of people (49%) believe that the situation will return to normal not earlier than in a year, 19% believe that this will happen in two or three years. There are older respondents (61%) among the "pessimists". About a third of the respondents (27%) believe that the situation will return to normal in a few months. There are more young respondents under the age of 30 (48%) among the "optimists".

The respondents indicated that they currently need support from the state more than ever - 77% said they need it urgently. Most often, the need for such support was indicated by respondents of middle (56%) and elder (72%) ages.

The measures taken to prevent the spread of coronavirus are assessed as sufficient by 59% of respondents, and as insufficient by 34%. When asked "What exactly are you doing for prevention in connection with the spread of coronavirus?" the respondents point out the following: 85% use personal protective equipment, 89% observe hygiene, 33% strengthen their immunity with various folk remedies.

In addition, most of the respondents (79%) believe the current coronavirus pandemic is more dangerous than the annual epidemics of influenza and other acute respiratory viral infections. At the same time, after the government introduced strict measures to counter the spread of the epidemic, the confidence of the respondents rose to 86%. Respondents with very high incomes were the most skeptical about the danger of coronavirus compared to ordinary flu and ARVI. Only half of them recognize this pandemic as something previously unheard of, and a third consider it a type of flu. People with an average

income are more afraid of the coronavirus than representatives of other income categories.

Anxiety for one's own life and for the life of loved ones grows in proportion to age, from 59% among young people to 87% among pensioners. There is a similar dependence on the level of education: the higher it is, the more anxiety people feel. As for income, the wealthiest feel twice as confident as the poorest (44% versus 21%). But even among the rich people, the share of those who are alarmed is minimal, but it is not small: 57% versus 71% among people with very low incomes.

Most of the respondents believe that the authorities will be able to prevent a widespread epidemic of coronavirus in Russia. The number among young people was 39%, and among pensioners up to 42%, which was largely due to the additional measures introduced by the authorities to combat infection. Among the measures introduced by the government, the most approved were such actions as the introduction of a self-isolation regime, mandatory lockdown of those who came from vacation, lockdown of all infected and those who came in contact with them, sanitization of premises and transport, the closure of theaters, concert halls and other entertainment events, the closure of the borders of Russia, the transition of educational institutions and enterprises to remote work/education, a ban for people over 65 and those with chronic diseases to go outside.

It is also worth emphasizing that the forced lockdown had an extremely negative effect on a large number of Russians, many of whom experienced extremely difficult psychological states. For example, to the question "Mark the reactions that you or your relatives and friends experienced in connection with the current situation of the pandemic", the following reactions were the top three: fear in 47% of respondents, apathy in 22%, and mental torpor in 14%.

Young people have become the most vulnerable part of the population. They did not acquire the established life values, have undergone tremendous influence and fear of such a global pandemic. During the pandemic, young people began to consume alcohol and tobacco more often, which definitely negatively affects the health and reproduction of young people. After all, they are the ones who are at risk in an unstable socio-economic situation, because at an early age they are going through the active socialization.

The main stresses during the quarantine were the following, depending on the degree of significance: fear of infection (74%), duration of quarantine (65%); frustration and boredom (52%); insufficient provision (food, clothing, medical services, household services, etc.) - 29%; inadequate information about the pandemic (23%).

When asked about the economic situation of respondents, 67% of working Russians reported a significant drop in family income since the start of the spread of the coronavirus. The most common tactics for surviving a crisis are to cut costs (53% of respondents reported switching to cost savings) and find an additional source of income (63% are aimed at finding additional resources). However, every third survey participant (33%) said that they did not know what to do. More than half of the surveyed Russians (55%) fear that their family will have nothing to live on and will not even have enough money for food. Most of the respondents (74% of respondents) have already felt the economic consequences of the spread of coronavirus infection. The overwhelming majority of respondents (86%) are sure that it will be difficult to find any new job in the current environment. Almost two-thirds of respondents (69%) do not have savings, and most of those who do have them will have enough funds in the event of a sudden loss of salary for six months maximum, according to the respondents.

The respondents now prefer to save money, invest in health, rather than spend money on momentary whims and claim that they have increased spending on home entertainment, fresh and healthy food, preventive medicine, education, and food delivery. On the other hand, more than 40% of the surveyed residents of

Moscow and Moscow region admit that they have reduced their expenses on travel and fashion, public transport, clothes shopping, mass entertainment, tobacco and alcohol, personal care, restaurants and games.

Unfortunately, it can be stated that half of Russians do not believe the official statistics on coronavirus. More than half (60%) of the study participants do not trust the official data on the number of cases and deaths. Among them, 38% consider the figures grossly underestimated, 17% believe that the data are insignificantly underestimated. 13% of respondents considered the information of the authorities reliable, 5% believe that the figures are too high.

The respondents' answers to the question "Do you think the number of cases of coronavirus in Russia will increase, decrease or remain at the same level in the next week or two?" turned out to be quite sad but it seems that they are very realistic. Every fifth respondent chose "Will grow significantly!" (23%). Another 21% were less pessimistic, believing that they will grow insignificantly. That is, almost half (44%) of the surveyed people believe that the number of cases of coronavirus in Russia will increase in the next week or two. However, there were also 18% of optimists who said that the number of cases "will significantly decrease." Another 13% supported this point of view - in their opinion the number will decline insignificantly. 9% are confident that the number will remain the same. However, it is more about belief in the best than realistic analysis. Specifically, the degree of pessimism is inversely proportional to age - 67% of respondents under the age of 24 and only 33% of pensioners expect the growth of the epidemic.

Probably the question of the prospects for the end of the pandemic was the most important. The respondents were asked: "There are different opinions about the time period when the epidemic (that is, the massive spread of the coronavirus in Russia) will end. When will this happen in your opinion?" As expected, the Russians do not expect a quick release. Only about a third (30%) answered with a secret hope that this will happen in the next month. Another 35% of respondents set themselves up for two to three months, 17% believe that the epidemic will last another six months, 10% - a year, and 8% - two years. The tendency in this question is the same: the older the respondent, the more he/she wants to believe in a quick release from the impending threat.

Disappointing forecasts of respondents were received to the question "What will happen to the income?". 49% of the surveyed people believe that the level of their well-being in the coming year will definitely deteriorate, another 27% believe that it will deteriorate slightly. Only 21% hope that income will remain the same. Finally, 1% answered that their financial situation in the coming year will definitely improve, and another 2% guess that their financial state will improve a little. The poorest people expect to hit the crisis first - 88% of them said that their well-being would deteriorate even more. Unfortunately, these figures do not say anything optimistic for social stability.

5 Conclusion

Virus epidemics have been a part of human life for centuries, people have faced terrible diseases many times in history, but modern society assumed that nothing could change the daily rhythm of people's life in the 21st century. As Covid-19 virus has shown, it is very easy to break a person and we are as weak creatures as other living beings on our planet.

In the context of the spread of the new coronavirus, for any person, country and the world as a whole the common truths of the universe, values traditional for believers and for atheists come to the fore. First of all, this is love, caring for loved ones, raising children, patience, mercy. In the pursuit of success and prosperity, some people managed to get out of these concepts. At the same time, understanding that life is the most important and the only value for each of us is rapidly growing.

The survey data show that the population is divided into two groups: some do not believe in the fact of the epidemic and argue against self-isolation, others believe that its peak is ahead and have already rebuilt their lives. The number of the latter is growing. For people, it is not the fear of infection or death that comes to the fore, but economic problems. In the current situation, even looking for a job when it is lost is often pointless. Right now, it is necessary for our state to fully and promptly take measures to provide social support to Russians, which are the most important.

In particular, these measures are:

- Increase in payments to existing recipients of social assistance: benefits for families with children, poverty benefits;
- Permanent additional payments to pensioners;
- An increase in the volume of assistance to the unemployed and the temporary abolition of a number of qualification conditions, according to which a person may be considered unemployed;
- Direct financial support for vulnerable institutions (orphanages, senior centers, medical facilities);
- Increasing the salary of social workers, hiring additional employees; material and technical support, including personal protective equipment;
- Budgetary support for local governments (for example, using developments of initiative budgeting).

Social isolation, loneliness, health anxiety, stress, economic decline are ideal conditions for mental problems to arise. If nothing will be done, then we may face an increase in mental disorders, such as anxiety, depression, as well as an increase in problematic behavior - alcoholism, drug addiction, bullying on the Internet, gambling. We may also face an increase in homelessness and breakups in couples. The scale of these problems is too serious to be ignored, both in terms of the impact on the life of the individual and on the society in general. A prerequisite for preventing such problems is the concern of the country's leadership to regularly monitor the mental health of Russians in order to assess the scale of the impending problem. The Independent recalls that after the SARS epidemic in 2003, the number of suicides among people over 65 increased by 30%, about 29% of health workers reported mental problems (Interfax, 2020).

The current alarming situation requires solidarity, responsibility, and mutual assistance. Not only the social welfare state originates here. This is where a human begins.

Literature:

1. Averin, Y.P., Sushko, V.A. (2020). Will a Post-Pandemic Society in Russia be Post-Liberal or Conservative? *Postmodern Openings*, 11(1Supl2), 161-168. doi 10.18662/po/11.1sup2/148
2. Banks today. (2020). Labor market during the epidemic and after: what will happen to vacancies and salaries, and what should be done now? *Banks today*. April 6, 2020. Available from <https://bankstoday.net/last-articles/rynok-truda-vo-vremya-epid-emii-i-posle-cto-budet-s-vakansiyami-i-zarplatami-i-cto-nuzh-no-delat-uzhe-sejchas>
3. Bill. (2020). Bill No. 973264-7 «On amendments to the Labor code of the Russian Federation regarding the regulation of remote work». *State Duma*. Available from <https://sozd.duma.gov.ru/bill/973264-7>
4. Burns, Yu. (2020). The European Commission has lowered its forecast for a global economic downturn in 2020. *Gazeta.ru*. November 5, 2020. Available from https://www.gazeta.ru/business/news/2020/11/05/n_15184267.shtml
5. Business. (2020) The authorities announced forecasts for the recovery of the Russian economy after the pandemic. *BUSINESS Online*. October 25, 2020. Available from <https://www.business-gazeta.ru/news/485861>
6. Caduff, C. (2020). What went wrong: corona and the world after the full stop. *Medical Anthropology Quarterly*. 1 – 21. doi 10.1111/maq.12599.

7. Chepur, E. (2020). Coronavirus hit the world economy. Why is this good? *Lenta.ru*. June 12, 2020. Available from <https://lenta.ru/articles/2020/06/12/corona>
8. Consultant Plus. (2020). Guide to HR issues. Obligations of the employer in case of epidemics. *Consultant Plus*. Available from http://www.consultant.ru/law/podborki/koronavirus_obyazannosti_rabotodatelnya/
9. Criminal code. (1996). Article 236. Violation of sanitary and epidemiological rules. *Criminal code of the Russian Federation*. June 13, 1996. Available from <https://ukrfkod.ru/statja-236>
10. Doguzova Z. (2020). Rosturizm revealed the losses of the industry due to the pandemic and the lack of tourists. *Rbc.ru*. October 19, 2020. Available from <https://www.rbc.ru/society/19/10/2020/5f8de4329a7947c66bdf1521?>
11. Interfax. (2020). Expert warned of impending mental health crisis. *Interfax*. April 16, 2020. Available from <https://www.interfax.ru/world/704497>
12. Kolganov, G., Reprintseva, Yu. (2020). The beauty industry is not strong enough. *Kommersant*, August 19, 2020. Available from <https://www.kommersant.ru/doc/4459439>
13. Kumar, A., Pareek, V., Prasoon, P., et al. (2020). Possible routes of SARS-CoV-2 invasion in brain: In context of neurological symptoms in COVID-19 patients. *J Neurosci Res*, 98, 2376-2383. doi 10.1002/jnr.24717
14. Lescure, F.X., Bouadma, L., Nguyen, D., et al. (2020). Clinical and virological data of the first cases of COVID-19 in Europe: a case series. *Lancet*, 20(6), 697-706. doi 10.1016/S1473-3099(20)30200-0
15. Makarentseva, A. O., Khasanova, R. R. (2020). Monitoring of the demographic situation (January-February 2020). *Monitoring of the economic situation in Russia. Trends and challenges of socio-economic development*, 9(111), 109-115. Available from <https://www.ranepa.ru/documents/02-07-2020-macarenceva.pdf>
16. Pronchev, G.B., Kuznetsova, I.V., Kolodeznikova, I.V. (2019). Intellectual emigration from modern Russia. *AD ALTA*, 9(1, SI 6). 13-16.
17. Rosstat. (2020). Information about the socio-economic situation in Russia (January-September 2020). Moscow. Rosstat. 118 p. Available from <https://rosstat.gov.ru/storage/mediabank/a0oy0RLz/oper-09-2020.pdf>
18. Sadiq, M. (2020). Policing in pandemic: Is perception of workload causing work-family conflict, job dissatisfaction and job stress? *J Public Affairs*. e2486. <https://doi.org/10.1002/pa.2486>
19. Senkalfa, B.P., Eyuboglu, T.S., Aslan, A.T., et al. (2020). Effect of the COVID-19 pandemic on anxiety among children with cystic fibrosis and their mothers. *Pediatric Pulmonology*, 55, 2128-2134. doi 10.1002/ppul.24900
20. Sushko, V.A., Pronchev, G.B., Shisharina, E.V., Zenkina, O.N. (2016). Social and economic indices of forming the quality of life. *International Journal of Environmental and Science Education*, 11(18), 10839-10849.

Primary Paper Section: A

Secondary Paper Section: AH, AO, AD

OPTIONS OF LEARNING PROCESS OF TEACHING SUBJECT INFORMATION SOCIETY

^aKATARÍNA SZARKA, ^bISTVÁN SZÓKÖL

J. Selye University, Bratislavská cesta 3322, 945 01 Komárno, Slovakia

email: ^aszarkak@ujss.sk, ^bszokoli@ujss.sk,

This research has been supported by the project titled KEGA No. 004UPJŠ-4/2020 "Creation, Implementation, and Verification of the Effectiveness of Digital Library with the Formative Assessment Tools for the Natural Sciences, Mathematics and Informatics at the Elementary School"

Abstract: Legitimizing of the tutoring outcome is different in several countries. Results of crude tutoring, in Slovak Republic is recognized with successful ending of the secondary school studies, high-school graduation, final exam, graduate exam and state examination. On European level there are no existing rules and regulation. Schools must to keep tempo with rapid improvement of technology, appraisal of social changes. They must to receive new form of teaching based on the results of appraisals about, how people learn, about effective usage of technology and skillfulness for 21st century. In the most countries of the world, its trend to create expectations for result of the schools work, we can say standards, which could be regularly controlled. From the most of products it's required to answer for predetermined standards, and these standards or norms are strictly controlled. In schools they don't do it. Nobody guaranteed, that the student of that school in which he learn the knowledge, skills, etc.

Keywords: different learning, teaching of module system, information society

1 Key competences, concept, definition

Currently, due to changes in Slovak Education we increasingly often meet with the concept of competencies, key competencies. We tend to speak about key competencies as a new phenomenon in education. The term originates from the 1970s in economics where it represented a set of specific requirements for the job seeker. It was transferred to the field of education in the late 90s where it serves as a bridge between the requirements imposed by employers in the labour market and the graduate's profile. The term competence is used both in professional and common language; and ability, skill, capability, effectiveness, capacity, desired quality, and others are used as synonyms for the group of terms. A person who has the abilities and skills, motivation, knowledge, etc. to carry out tasks well in a particular field is considered competent. Competence is usually applied to individuals, social groups, and institutions in case they successfully fulfill requirements and achieve goals set by their environment. The theory of key competencies has not yet been completely formulated and neither does a comprehensive and widely accepted definition exist. As Hrmo (2013) states in his publication *Key Competences*: "Competence is the behaviour (activity or set of activities), which characterizes excellent performance in a specific field. Key competences are the main competences of a set of competences. They are suitable to solve a wide range of mostly unforeseen problems which allow an individual to cope with rapid changes at work, personal and social life."

According to Hrmo (2013): „Key competences are a set of interiorized, interconnected group of acquired knowledge, skills, abilities, attitudes and valuing approaches, which are important for the qualitative personal development of the individual, his/her active participation in society, application in employment and lifelong learning.

Another definition states: "Having competence means having a complex equipment of personality, which allows the individual to successfully address challenges and situations in life, in which one is able to adequately orient, take appropriate actions and take a beneficial attitude. Key competences need to allow the individual to continuously refresh the skills and knowledge applicable in everyday life. For a person in training not all educational activities (cognitive, training, and educative) need to be beneficial, but especially those, which are useful in standard practice, provide quality education and correspond with company requirements in the labour market. Not only the attended educative process or certificate of the attended educative process are crucial, but also the learning outcomes.

2 Areas of key competences

Education in each field should be directed toward each individual creating the following key competences consistent with their levels and scholastic aptitude (Horváthová, 2011):

- Informational
- Learning
- Cognitive
- Interpersonal
- Communicative
- Personal

2.1 Informational competences

Information technologies are key elements in building the modern society based on knowledge. Information competences are mainly ICT literacy and digital literacy.

However, ICT literacy and digital literacy are conceptualised in different ways. The term digital literacy is generally used in relation to a wider range of technologies than ICT literacy, but the terms largely overlap and it is common that they are interchanged. None of them focuses on technical aspects of the field, such as programming and computer operations. Rather, they have focus on the use of ICT and digital devices in different ways.

ICT literacy may be explicitly defined as the ability to locate, evaluate and use information in a way that makes a person an independent, lifelong learning individual; as the ability to locate, evaluate, use and communicate information in various forms, such as the integration of written, computer, media and technological literacy, ethics, critical thinking and communication skills (Fehér, 2018).

Digital literacy may be viewed as the ability to address problems, which means to educate and expand the following skills:

- distinguish essential phenomena from non-essential,
- navigate in information and evaluate them,
- provide the necessary information,
- choose (evaluate) and use appropriate methods, concatenate or combine various methods to solve problems, or adapt or propose a new method, which solves a professional problem,
- express facts and their phenomena mathematically,
- carry out calculations,
- use outcomes – solve a problem.

Such worded computer literacy, or information literacy is not the content of only a chosen group of subjects, which contain the expressions "computer technology and information technology" in their names, but all the subjects as a whole, the problems of which will be solved, while apart from the mechanics of using computers, the emphasis is on the thinking process, evaluation, decision, optimizing and realization (Brestenská, 2019).

The model of securing ICT competences – future teachers will have compiled a lesson plan on the basis of test results – as recommendation which modules they should attend, and identify them task to be carried out independently. Test results also determine which thematic areas (teaching units) how many times repeat. The student (future teacher) based on requirements and self-awareness may develop his own, individual study plan. If s/he does not accept this responsibility, the teacher – based on the outcomes of the entry tests – can propose an optimal study plan, which the student can, but does not necessarily have to respect. The tasks are defined in a way that prepares the learner to successfully pass the tests.

2.2 Learning, cognitive and interpersonal competences

The development of learning competences mainly supports the knowledge of learning styles, which sum up preferred practices of teaching and learning in a particular period of life of an individual, who develops, changes and improves from basics individually. Learning competences involve readiness to learn as well as to teach, motivation, a deep approach of learning, and the whole process of learning (Páleníková, K. – Jenisová, Z., 2017). Cognitive competences involve critical and creative thinking, problem-solving. Problem-solving is closely linked to the ability of critical and creative thinking. As a result, we can avoid many and more unnecessary errors while thinking.

Interpersonal competence means the effective coexistence and cooperation, where you need:

- ability to work in a team (group) – cooperation (joint responsibility of the planning, organizing, operating, and evaluating a team; development of leadership and management skills),
- empathy (empathizing with the emotional state and situation of other people)
- solving conflicts through peaceful means – assertiveness to enforce the rights, needs, and interests (not being a passive and manipulative object),
- creating and maintaining harmonic and progressive interpersonal relationships (respecting the ethics of proper manners, responsibility, and morality in terms of good relations with other people, mutual understanding and helping others),
- creating intercultural systems based on constructive negotiations, compromises, tolerance, and pluralism (acceptance and recognition of the difference in human views, opinions, values, faith, ethnic origins, various cultures, different areas of expertise, and thus the ability to live in an alien environment – as a manifestation of ethical conduct),
- developing the democratic civil system, respecting human rights and basic freedom, peacekeeping (effort not to fight and rule over others), keeping a healthy environment.

2.3 Communicative and personal competences

The basis of communicative competences is expressing adequately to the situation in writing and speech, listen carefully, and read with comprehension. The EU requires everyone, who lives in the countries of the European Union the knowledge of two foreign languages.

Personal qualities of individuals should promote the effective functioning of the society by coexistence and cooperation, develop authentic personal and work life. Personal competences involve self-awareness, self-control, as well as self-motivation and commitment.

3 Teachers' competences

There are several different views on the classification of key competences Belz-Siegrist (2001).

According to the above mentioned key competences were formed the competences of teacher mentioned in many studies (Caena, 2011). The main field of teacher competences are:

- Professional: the teacher as a guarantor of scientific bases, subjects of his/her own approbation,
- Psycho didactic: the teacher as an individual, creating pleasant conditions for learning
- Communicative: the teacher as an individual, using an appropriate level of verbal and non-verbal communication with students, parents and colleagues,
- Diagnostic: the teacher is able to diagnose problems of students,
- Planning and organizational: the teacher is able to plan his/her actions,

- Advisory and consultative: the teacher is able to help and advise the parents of his/her own students,
- Self-reflexive: the teacher is able to evaluate and modify his/her own educational activity.

Apart from the mentioned competences some countries also develop cultural awareness, labour and business competences, and health education. Due to their small representation in studied foreign systems, these systems are not dealt with any closer in this paper.

4 Quality of education

In the field of education, quality may be understood as a normative category, which may be expressed by the following indicators: quality of educational processes, educational institutions, the educational system is functioning (optimally) / or the production of these processes and institutions. It can be prescribed to certain conditions (e.g. educational standards), and therefore be objectively measured and evaluated (Benedek, 2015).

Factors determining the quality of education

- The curriculum
- Teaching methods, procedures, and means implemented in the educational process,
- Forms of knowledge verification,
- The independent creative activities of students and their involvement in research,
- Internationalization of education,
- Personal, spatial and informational assurance of the educational process,
- Securing the study literature for subjects of the study, and more.

Using the concepts of quality and efficiency are indeed very frequent, but often, without a clearer definition. Especially with the introduction of globalization, the concept of quality occurs in virtually all areas of human activities, including education. Education is a service provided by an educational institution. Firstly, it is important to note to whom this service is intended and what its purpose is. Furthermore it is imperative to understand that learning cannot be assumed clearly as an economic standpoint. The level – quality of education may be evaluated, but more subjectively, qualitatively than objectively and measurably, continuously and long term. The specifics of higher education is its 'optional nature (Szókö, 2016)'.

In education the term quality (quality management) refers to several elements, mostly to:

- The educational system: the basis is the quality of the country's (region's) educational system, its goals, philosophy, educational content, the structure of the educational system, principles of management and financing of education, incorporation of children, youths, and adults into the educational system, the ability to achieve the qualification, flexibility, and openness of the educational system. To increase the quality of the educational system in a certain country, international comparability of its performance is needed through international surveys, such as PISA, TIMISS and so on.
- School (school facility): We explained above that the degree of quality (decrease in population – struggle for students, funding per pupil, etc.) is the key to the survival (existence) of schools. Each school ought to develop its own quality management system, which would apply to all proceedings pending at the school and would include all school staff as well.
- Teaching process: The teaching process is the most important of all processes at school and therefore its quality is a crucial element for the quality of schools. The quality of the teaching process in the subjects they teach can also increase the individual teacher (group of teachers)

if the school has still not implemented quality management.

- Learning of pupils and students: The quality of learning of pupils and students is the culmination of efforts to increase the quality of education. The aim should be to make pupils, students acquire rational ways of learning - learning competences, to be aware of their preferred learning style and implement it, as well as metacognition and also metalearning to implement an in-depth approach to learning. The result should be a strategically focused student, someone, who wants to take responsibility for managing their learning, which is learned, and can manage their own learning, which is able to optimize their learning in school, out of school and after their school era. Such pupils and students have the greatest chances of success in the current, constantly and rapidly changing world, because they will be more successful in lifelong learning (Horváthová, 2011).

5 The concept of the information society

Information society from the point of view of an ordinary person is a society where the work with information is an everyday activity. Some different information and communication technologies (ICT) are used to work with information that means the methods, procedures and means such as a computer, electronic diary, mobile phone and so on.

From a social point of view, the information society is a society in which informatics and information and communication technologies are becoming an economic force, identifying and transforming the entire social system and acting as a means of creating new social, supra-class and supranational structures fundamentally altering the mechanisms of social development.

Challenges of the information society and further directions of development have been the subject of a number of papers at the international and national level. The following ones have an important role within the frame of documents of national character:

- Policy of Informatizing Society in the Slovak Republic for the years 2012 - 2015 with a view to 2020.
- National Action Programme of Society Informatization
- Millennium - National Programme of Education in the Slovak Republic for the next 15 to 20 years (10-13)

The main benefits of the information society are:

- making available the usage of information sources and their tools by the general public,
- expansion and improvement of means of services and entertainment,
- promotion of education,
- new opportunities for the application of human creative abilities, as well as the employing of handicapped people in life through "teleworking"
- increasing of cultural traditions and identity of regions,
- more efficient state administration,
- more effective management of enterprises, improving competitiveness, facilitating of connection between the manufacturer, service provider and the customers themselves,
- new services in the telecommunications and new markets in the field of software,
- more effective health care.

Information Society was firstly taught at the J. Selye University in winter semester of the academic year 2019/2020. Since the subject of Information Society was not included in the accredited programs, the content of the course was divided into several subjects.

The most of the topics were included in the basic subject of Information and Communication Technologies, taught in the first years of education at the Faculty of Economics of the Janos

Selye University. Part of the topics appears in the continuing subject of Information and Communication Technologies II. The subject of Informatics is taught only one semester at the Faculty of Economics so only four modules of Information Society are taught by means of presentations. Individual modules were evaluated on the basis of tests, which had to be passed by all the students as the procedure within the exam. Tests were carried out in the LMS environment of Moodle, where the teacher could exactly evaluate the different parts and process the percentage of success.

Thematic unit on e-learning has found its place in the subject Didactics of Informatics, which is an organic part of the Master Teacher Training program. Thematic unit on legal standards of information society forms a part of the subject called Law and Ethics in the Use of Information and Communication Technologies.

5.1 Course: Developing information literacy

From our previous experience of working with students and execution of subjects in the first years, it shows that students come to college with ever-improving skills of ICT. Not always, however, are these skills sufficiently comprehensive and are usually associated only with general information literacy. Our aim is to develop these skills in students and shape subject information literacy.

The course will take the form of e-learning as part of the subject Information Society. Since we believe it is necessary to convey the students the following information as soon as possible we have chosen Information Society as a reference subject, due to its concentration on first-year students on the Faculty of Education.

The course is made up of five modules, each of them containing two chapters. Modules that are used as a proposal for teaching e-learning courses have specifically defined instructions for studying, introduction, module objectives, content and performance standards, instructional text, summary, auto-test, additional literature, conclusions, and bibliographical references (Szókö, 2010).

- Module 1
 - a. The main concepts of Information technologies
 - b. Using the computer and managing files
- Module 2
 - a. Text processing (Word processor)
 - b. Spreadsheet Calculator (Spreadsheet program)
- Module 3
 - a. Electronic presentation
 - b. Information and communication
- Module 4
 - a. Graphic editor application
 - b. Database system
- Module 5
 - a. Information society
 - b. Algorithms and algorithmization.

Individual modules are completed with a self-test summarizing the discussed curriculum. After the successful completion of this test, students will be able to advance to the next module. At any time-frame of the program, students will be able to use electronic consultations (Szókö, 2010).

The study support of each module is divided and structured so that the acquisition of knowledge and the creation of knowledge by the study participants work with maximum efficiency. Efficiency lies mainly in the fact that the study participants can fully engage in the study of the educational content because it is not constrained by directed learning, as the study text includes features allowing rapid and accurate auto-regulation. Participants in the study, after applying for the subject (course) receive the study materials.

6 Results and Discussion

The questionnaire included four teacher competences that are closely related to internationalization of education:

Communication in foreign languages, digital competence, interaction skills, and cooperative skills. The averages for each listed competence were calculated from the questionnaire. We can conclude that none of the listed competences reached worse than 3 points average – this means that the respondents consider them at least as important or higher.

Communication in foreign languages is based on the ability to understand, express, and interpret concepts, thoughts, feelings, facts, and opinions in both oral and written form in an appropriate range of societal and cultural contexts (in education and training, work, home, and leisure) according to needs. Competence in foreign languages requires knowledge of vocabulary and functional grammar and an awareness of the main types of verbal interaction and registers of language. Knowledge of societal conventions and the cultural aspect and variability of languages is important. Essential skills for communication in foreign languages consist of the ability to understand spoken messages, to initiate, sustain and conclude conversations and to read, understand and produce texts appropriate to the individual's needs. A positive attitude involves the appreciation of cultural diversity, and an interest and curiosity in languages and intercultural communication European Communities (2007).

Digital literacy involves the ability of confident and critical use of IST (Information Society Technology) for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present, and exchange information, and to communicate and participate in collaborative networks via the Internet European Communities (2007). *Digital literacy* is closely linked with technology skills. The use of ICT in teaching is also a certain technological process. This includes a variety of technical devices used alone or in combination with other teaching aids. Using ICT can be easily and quickly connect with people from abroad, and so consult with experts or obtain new information to learn. However, the information is mostly not available in national language.

Interaction skills are a part of interpersonal skills. Interpersonal interaction is a communication process that involves the exchange of information, feelings and meaning by means of verbal and non-verbal messages, between two or more persons (teacher and children, or teacher and others). Children learn and develop by interacting with teachers, each other, family and other persons. Adults who are respectful listeners and keen observers, who are prepared to negotiate, who change their practice, and who make meaning with children are those who are most responsive to them. They know the children well, are sensitive to their current level of understanding, know their interests and intentions, and pitch activities and experiences which are just beyond what they can currently do and understand so that they can extend their learning. Their interactions promote children's learning and development and help children to reach their full potential (Ugrai, 2020).

Cooperative skills are a skill-set everyone needs to be able to cooperate effectively – i.e. work with others in a collective, non-hierarchical, democratically managed organizational structure. The cooperating teacher has the greatest and longest-lasting influence on not only the student teaching experience but also the aspiring teacher's growth and development long after student teaching has ended (Benedek, 2015).

In our research of all monitored key competences, teacher competences, skills, knowledge and other attitudes *communication in the mother tongue* reached the highest preference. Similarly, it was ranked first in the competence survey provided by Szököl (2016) conducted by practicing

teachers in Hungary. Overall, we found that our results and results by Szököl (2016) in terms of the most preferred teaching competences are very similar.

Only three competences reached the average value of 4.5 points: *communication in the mother tongue, ability to take responsibility and expertise.* Similarly, *interaction skills and cooperative skills* got high scores in our questionnaire as well (Tab. 1).

However, the lowest value (3.21 points) in our survey was achieved by *mathematical competence and basic competences in science and technology* – despite the fact that this competence also belongs to key competences. Although the preference for *digital competence* is higher than *mathematical competence and basic competences in science and technology*, but it is also very low, on the 33rd place in the ranking of all forty observed key competences, teacher competences, skills, knowledge and other attitudes. In the list of eighteen competences published by Bendíková (2014) *digital competence* is ranked in 16th place with 3.65 points.

Basic statistical evaluation of four selected teacher competences of the research is presented in Table 1.

Tab. 1: Statistics on four selected teacher competences

Key competences, teacher competences	Maximum	Minimum	Range	Modus	Mean	Variance	Standard deviation	Median
Communication in foreign languages	5	2	3	4	3.73	0.70	0.84	4.00
Digital competence	5	2	3	3	3.56	0.62	0.79	3.50
Interaction skills	5	2	3	5	4.41	0.52	0.72	5.00
Cooperative skills	5	2	3	5	4.31	0.54	0.73	4.00
Sample size: 4	5	2	3	4.25	4.01	0.59	0.77	4.10

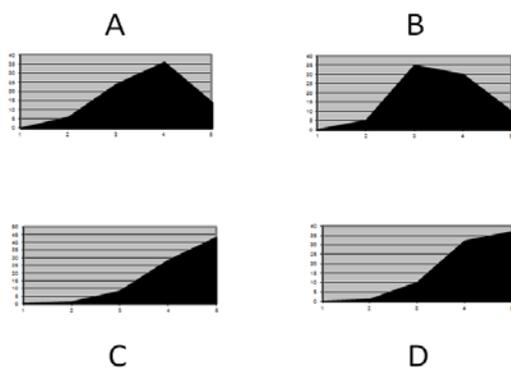
Tab. 2: Statistics of observed forty teacher competences

Key competences, teacher competences	Maximum	Minimum	Range	Modus	Mean	Variance	Standard deviation	Median
Sample size: 40	4.58	3.21	1.37	4.20	3.90	.14	.37	3.86

Tab. 3: Preference of four selected teacher competences

Key competences, teacher competences	Answers				
	1 Unnecessary %	2 Less necessary %	3 Important %	4 Very important %	5 Indispensable %
Communication in foreign languages	0.00	7.50	30.00	45.00	17.50
Digital competence	0.00	6.25	43.75	37.50	12.50
Interaction skills	0.00	1.25	10.00	35.00	53.75
Cooperative skills	0.00	1.25	12.50	40.00	46.25

Table 3 shows the distribution of response preferences of the four selected teacher competences and Chart 1 shows their histograms. According to the histogram is clear that the low average values are determined by the lower preference of high score responses – that means, the end of the A and B graph curve falls (on Chart 1) – in comparison with the graph, in which the curve clearly rises, for example in case of C and D (on Chart 1) or *communicating in mother tongue* (7).



A – Communication in foreign languages, B – Digital competence, C – Interaction skills, D – Cooperative skills

The reasons why should occur internationalization and modernization of teacher training programmes: students obtain updated information and knowledge and not are burdened with data and knowledge not essential to their future life. Graduates succeed in today's world and be competitive in the labour market; are not only educated, but also are confident and independent; become able to work creatively, solve unforeseen situations but also to cooperate with others regardless of whether it is a fellow citizen or foreign.

5 Conclusion

Knowledge is only the basis of preferred core competencies of the individual and may not be sufficiently beneficial for individuals, even if they were associated with other components of competences. Acquiring key competencies is a life-long process. In order for these competencies to be developed qualitatively, we need to achieve a quality education system.

In applying for an e-learning course the process of initial motivation, the evaluation and classification of individual modules, and the process of exposure of the new curriculum are bound to be dealt with.

For teachers to lead their students to the use of the internet in the learning process, they need to gain ICT and digital literacy, which means that they will get to know, understand and be able to explain the basic concepts of ICT and digital technologies, able to use a computer and digital devices, work with data sets, with text, create and work with tables, charts, figures, create and work with databases, create presentations, obtain and share information and communicate, to operate with the internet, handle the e-mails, create web pages, blogs/vlogs etc.

Literature:

1. Belz, H., Siegrist, M.: *Klíčové kompetence a jejich rozvíjení*. Praha: Portál, 2001. 375 p.
2. Bendíková, E.: Lifestyle, physical and sports education and health benefits of physical activity. In *European researcher: international multidisciplinary journal*. Sochi: Academic publishing house Researcher, 2014. Vol. 69, Issue 2-2, pp. 343-348. ISSN 2219-8229.
3. Benedek, A.: *Visuality as a tool for expanding learning*. In: Teixeira, A.M., Szűcs, A. & I. Mázár (eds.), 2015 Annual Conference. Barcelona: European Distance and E-Learning Network (EDEN), 2015. pp. 3-8. ISBN 978-615-5511-03-5.
4. Bilčík, A.: *Podpora záujmu žiakov a ich spokojnosti s vyučovaním na stredných školách*. In: Berková, K., Krpálková Krellová, K. (eds.). SCHOLA NOVA, QUO VADIS? Reviewed Papers of the 3rd International Scientific Conference. Praha: Extrasystem Praha, 2018. pp. 31-36. ISBN 978-80-87570-40-1.
5. Brestenská, B. et al.: Teacher Trainees' attitude towards the implementation of selected web-based applications in teacher training. In *CBU International Conference Proceedings 7*, pp. 387-392, 2019. DOI:https://doi.org/10.12955/cbup.v7.1389

6. Caena, F.: Literature review Teachers' core competences: requirements and development. *European Commission Thematic Working Group 'Professional Development of Teachers'*, 2011.
7. Fehér, Z.: Digitálne kompetencie študentov - štatistická analýza prieskumu. In: *Inovácie v pregraduálnej príprave učiteľov s využitím webových aplikácií*. Komárom: KOMPRESS Nyomdaipari Kft., 2018. pp. 13-32. [print]. ISBN 978-615-00-2597-1.
8. Golnhofer, E.: *Pedagógiai értékelés*. In Falus, I. (eds.) *Didaktika*. Budapest: Nemzeti Tankönyvkiadó, 2003. pp. 385-417. ISBN 978-963-19-5296-4.
9. Horváthová, K.- Szököl, I.: *Kontrola a hodnotenie žiackych výkonov v národnostných školách na Slovensku*. Monographiae Comaromienses 9. Komárno: Univerzita J. Selyeho, 2013. 120 p. ISBN 978-80-8122-083-8.
10. Horváthová, K.: Súčasný požiadavky na proces riadenia škôl a prípravu školských manažérov v Slovenskej republike. In: *Otázky koncepcie prípravy riadiacich zamestnancov škôl*. Nitra: PF UKF Nitra, 2011. pp. 9-47. ISBN 978-80-558-0001-1.
11. Hradzilová Bočková, K. - Gabrheľová, G. - Porubčanová, D.: *Game Theory as a Tool of Conflict and Cooperation Solution between Intelligent Rational Decision-makers in Project Management*. In: *International Journal of Economic Perspectives*. Vol. 10, Issue 4, 2016, pp. 147-156. ISSN 1307-1637.
12. Hrmo, R. - Podaril, M.: *Introduction of Quality Management Systém for Vocational Education and Training in Slovakia* (e-document). DOI 10.3991/ijep.v3i3.2733. In: *International Journal of Engineering Pedagogy*. Wien: International Association of Online Engineering, 2013, Vol. 3, Issue 3, pp. 18-23 (online) ISSN 2192-4880.
13. Kolar, Z., Vališová, A.: *Analýza vyučování*. Praha: Grada Publishing, 2009. 232 p. ISBN 978-80-247-2857-5.
14. Kostrub, D.: *Dieťa/žiak/student – učivo – učiteľ, didaktický alebo bermudský trojuholník?* Prešov: Rokus, 2008. 169 p. ISBN 978-80-89055-87-6.
15. Krellová, K. - Vašková, E.: *How to increase efficiency of technical education*. In *CO-MAT-TECH 2003*. Bratislava: STU, 2003. ISBN 80-227-1949-8.
16. Marks, I. - Lajčín, D.: *Anton Štefánek a slovenské školstvo v medzivojnovom období – vybrané problémy*. Brno: Tribun EU, 2017. 119 p. ISBN 978-80-263-1362-5.
17. Marks, I. - Lajčín, D.: *Moderná škola v ponímaní Antona Štefánka*. In *Paidagogos: časopis pro pedagogiku v súvislostech*, 2016, No. 2, pp. 125 – 140. ISSN 1213-3809.
18. Nagy, M. et al.: *Elsőéves hallgatók véleménye a tanári kompetenciákról körében. Új kihívások és pedagógiai innovációk a szakképzésben és a felsőoktatásban*, A VIII. Trefort Ágoston Szakképzés- és Felsőoktatás-pedagógiai Konferencia tanulmánykötete, 2018. pp. 56-65. ISBN 978-963-449-148-4.
19. Páleníková, K. - Jenisová, Z.: Differences in characteristics of an actual teacher and the vision of an ideal teacher from in-service teachers' point of view (perspective) In: *10th Annual International Conference of Education, Research and Innovation (ICERI) Book Series: ICERI Proceedings*, 2017. pp. 2115-2124. ISBN: 978-84-697-6957-7.
20. Porubčanová, D.: *Analýza roli profesie vysokoškolského učiteľa* In: *Vzdelávaní dospelých 2017 – v době rezonujících společenských změn: proceedings of the 7th International Adult Education Conference*. Praha: Česká andragogická společnost, 2018. pp. 245-255 [print] ISBN 978-80-906894-2-8.
21. Porubská, G.: *Aktuálne problémy slovného hodnotenia na 2. stupni ZŠ*. In: *Slovné hodnotenie na druhom stupni základných škôl: Zborník príspevkov z vedeckej konferencie* Nitra: UKF, 2000. pp. 101-108. ISBN 80-8050-320-6.
22. Prucha, J.: *Moderní pedagogika*. Praha: Portál, 1997. 480 p. ISBN 80-7178-170-3.
23. Szarka, K.: *Súčasný trendy školského hodnotenia: Koncepcia rozvíjajúceho hodnotenia*. 1. vyd. Komárom: Kompres, 2017. 147 p. ISBN 978-963-12-9692-1.
24. Szököl, I.: *Educational evaluation in contemporary schools*. Szeged: Belvedere Meridionale, 2016. 159 p. ISBN 978-615-5372-60-5.
25. Szököl, Š.: *Modulárny systém výučby informatiky*. Komárno: Univerzita J. Selyeho 2010. 100 p. ISBN 978-80-89234-97-4.
26. Škoda, J., Doulík, P.: *Psychodidaktika*. Praha: Grada. 2011. 178 p. ISBN 978-80-247-3341-8.

27. Tóth-Bakos, A. et al.: Webové aplikácie v príprave budúcich učiteľov – hodnotenie ich didaktických aspektov. In *Medzinárodná vedecká konferencia UJS: „Hodnota, kvalita a konkurencioschopnosť-výzvy 21. storočia“*. Komárno: Univerzita J. Selyeho, 2017, pp. 107-119. ISBN 978-80-8122-221-4.
28. Ugrai, J.: *The Highs and Lows of Reform. The Divergent Development of Public Education and Teacher Training in Hungary*. In: *Foro de Educación*, 2016. Vol. 14. Issue 21. pp. 39-57.
29. Vass, V.: *Creative School: Renewing Leadership for Creativity*. In: Marek, T. et al. (eds.): *Human Factors of a Global Society: A System of Systems Perspective. Education in Modern Society*. CRC Press, Taylor and Francis Group. Florida, US. 2015. pp. 969-974.

Primary Paper Section: A

Secondary Paper Section: AM

INTRODUCTION OF MODULAR AND ADAPTIVE TEACHING OF INFORMATION AND COMMUNICATION TECHNOLOGIES

^aISTVÁN SZÖKÖL, ^bLUCIA KRIŠTOFIAKOVÁ

^aJ. Selye University, Bratislavská cesta 3322, 945 01 Komárno, Slovakia

^bDTI University, Sládkovičova 533/20, 018 41 Dubnica nad Váhom, Slovakia

email: ^aszokoli@ujis.sk, ^bkristofiakova@dti.sk

Abstract: Information and communication technologies play an important role in university studies. Students are expected to learn on their own whilst using modern technologies. To support this, subjects that create preconditions for this process, can be found in the first year study program. Since the first year students' skills vary in the field of ICT an individual approach is approved. The study describes the model of modular and adaptive teaching of Information and communication technologies at the J. Selye University in Komárno and discusses the results achieved

Keywords: ICT, modular system, adaptive teaching, information literacy, communication technologies

1 Introduction

Those students who are admitted have a different level of expertise in the field of information and communication technologies. There are big differences among students in the above-mentioned area. One of the reasons is that students come from different types of grammar schools. Another reason is that at the same type of schools the level of teaching Informatics differs. In addition, some students lack proper inner motivation. First two reasons can be considered as outer conditions of education, these are closely connected with the preparedness of schools, the necessary equipment and trained teachers. Supply of equipment is a financial matter and can be changed within a short period from unsatisfactory to excellent. To train the teachers is more complicated. It seems that big differences among admitted students will remain an unsolved problem for a long time.

2 Information literacy

The aim of the subject Informatics is to provide students with proper information literacy that is necessary to finish their studies and is essential in our information society. Information boom is a new challenge for the capacity of the human mind to absorb the growing number of information. A new approach should be introduced in education. The main aim of education is to develop skills of students, e.g. learning, creativity, critical thinking, usage of information and communication technologies. School is no longer the main source of information. There is a competition with medias and electronic information sources.

There must be a shift from the traditional concept of teaching to a more progressive one, where the emphases are put on the process and application of information and to increase the effectiveness of learning. Information literacy is an ability of an individual to get and use information (Szarka, 2017).

A computer-literate person in the modern society should be able to ascertain the need for information, recognize what sort of information s/he needs and to determine the extent of required information, to gain and use information ethically and legally, to assess critically the obtained information and its resources, to incorporate the obtained information into a system of one's own knowledge, to constantly update the knowledge and identify the problems to be solved, to use information efficiently to solve actual tasks, to understand and respect economic, legal, social and cultural problems, connected with the usage of information, to classify, archive and process the obtained or created information, to recognize computer literacy as a necessary prerequisite for lifelong education (Marks-Lajčín, 2016).

3 Competences and Standards of Teacher in Information Society

Standards

In the most of countries in the world there is a national trend to create the requirements on the work results of schools, so-called Standards, that are regularly monitored. The most of products are required to meet a predetermined standard, norm whereby meeting of the requirements are strictly controlled. However, it has not been provided in educational system. Nobody has basically guaranteed that the graduate has mastered the required knowledge, skills, attitudes and etc. The idea of Standards in education has begun to promote during the last few decades according to the example of the industry (Szököl, 2016).

The term of Standard means the degree of perfection required for a particular purpose or accepted or approved model (pattern, standard, rate) by which are real objects and processes of the same category being compared or measured. The Standards are therefore required and binding characteristics of quantitative or qualitative properties of a particular object or phenomenon.

Nowadays, multiple kinds of standards are currently discussed in the educational system. For example, the pedagogical literature distinguishes these types of standards in the United States (National Standards for Civics and Government. Draft for Review and Comment. Center for Civic Education. Calabas)

Students' Standards: have dual form: content and performance. Content Standards are requirements that state what students should know or can do.

The content and scope of the different subjects are defined by the curriculum. The subject matter is represented mainly by appointing of the knowledge to be made available to students. In the context of rapid scientific and technological development an explosion of information has begun thus resulting in an overdimension of the curriculum. The overdimension can also be caused by the fact that allocated time for the teaching of certain subjects is reduced whereby the curriculum content remains essentially unchanged. Only way to remove overdimension of school curriculum is to exempt the school from the effort to pass the maximum amount of information, i.e. to determine basic subject matter (Bilčík, 2018).

Performance Standards are detailed elaboration of the Content Standards and contain the level of achievement that is expected of them. There are three levels of achievement standards: basic, intermediate and advanced. They are also called target standard. Teachers' Standards: They essentially contain the detailed qualification requirements for teachers in order to help students to accomplish the performance standards.

Schools' Standards: They include criteria for schools. Their fulfillment is to ensure all students an equal opportunity to achieve the content and performance standards.

State and Local School Authorities' Standards: They contain criteria to assess the success of the state and local school authorities in fulfilling their mission in education.

Performance and Content standards form the Educational Standards. Each Content Standard should be determined by elaborated Performance Standards and vice versa. Both standards correspond to each other (Benedek, 2015).

Evaluation Standards

They are an essential building block in the development of educational programs. Evaluation Standards define the set of criterias, organizational and methodological procedures for verifying the achievement of learning outcomes or professional

competences. In relation to the acquisition of qualifications they must be based on qualification standards.

Evaluation standard includes:

- evaluation criteria for each general and professional competence. They determine how to establish the evidence that learning has been completed and demonstrated for the required competence. They must be linked to learning outcomes. Since the competences determine what a person has to know and perform within a given qualification or employment, the criteria determine according to what we know whether these competencies are actually acquired. The criteria must be specific, clear, objective and relevant in relation to the particular competence. They must relate to only one competence.
- The means and methods of evaluation - defining ways and means of verification of particular competences.
- Organizational and methodical guidelines - for the course of tests. These are the different rules and regulations for final exams and school leaving examination that are part of the valid legislation (Bendíková, 2014).

3.1 Information literacy standards of future teacher

Undermentioned set of standards was elaborated by IVIG - Expert committee on information literacy and output information literacy at universities. „ These standards defining knowledge, skills and abilities of information literate students or teachers relate only to study and professional work in the field. In this sense, information literate graduates of grammar school or future teachers (Hrmo-Podaryl, 2013):

- are able to understand specialized texts of their field of study, to abstract from any essential thoughts and to write professional texts themselves using knowledge of information sources that are quoted with respect to copyright law and to the principles of creation of bibliographic quotation
- know and monitor key information sources of their field of study based on advanced search methods and with respect to the legal and moral aspects of this activity they are able to obtain relevant information and thus obtained data of different types and formats they can manage and store for further use in their professional work
- can use sources of numerical and technical information, search and process numerical and technical data and use them in their professional work.
- can master the native language and can verbally and in writing express their own ideas, know and use the terminology of mother and a foreign language, especially English, at the level necessary to work with professional information sources and communication within the field community
- can use available information and communication technologies needed for searching, processing and presentation of information (of various type and format), relating to his studies and professional work. (Professional committee IVIG Association of Libraries of Czech Universities, 2004).

4 Key competencies, concept, meaning

Currently, in connection with changes in the Slovak Education we meet more often with the concept of competencies, key competencies. There is a tendency to speak about the key competences as of a new phenomenon in education. This concept was originated in about 70's of the 20th century in economics, where it represented a set of specific requirements for the job seeker. It was passed into the field of education late in the 90's, where it serves as a bridge between the requirements placed by employers on the labor market and graduate profile.

The concept of competence is used in a professional and in everyday language and as synonyms are also used such words as the ability, skill, efficiency, capacity, and other required quality

and so on. As a competent person in a particular area is usually regarded a man who has the skills, motivation, knowledge, skills, etc. to work properly in the required area. The concept of competence is usually applied to individuals, social groups and institutions, unless they successfully achieve the objectives and meet the requirements of their surrounding environment. The theory of key competencies is not yet fully formed and there is still no comprehensive and generally accepted definition of key competencies. Hrmo and Podaryl (2013) mentioned in their publication the Key Competences: "Competence is the behaviour (activity or set of activities), which characterize the excellent performance in any field of activity. Key competencies are the most important competencies from the set of competencies. They are appropriate to solve a wide range of mostly unforeseen problems that enable individuals successfully to cope with the rapid changes at work, personal and social life."

According to the another author: Key competences are interiorized, interconnected set of acquired knowledge, skills, abilities, attitudes and value orientations that are important for the quality development of the individual's personality, his active participation in society, employment and his lifelong learning. The next definition states: Having competence means having comprehensive amenities of personality that allows individuals to cope up with tasks and situations in life successfully, in which they are adequately able to take appropriate actions and take a beneficial attitude. Key competences should enable individuals to continuously update their knowledge and skills applicable in their everyday practice. For a learning person it may not be beneficial to do some educational (cognitive, training, educational) activities, but especially those that are useful for the life practice, providing him with quality education, corresponding to the requirements of the organizations and the labour market. The most important are educational outcomes, their quality but not only completed educational process or obtained a certificate of the education (Varga, 2015).

5 The concept of the information society

Information society from the point of view of an ordinary person is a society where the work with information is an everyday activity. Some different information and communication technologies (ICT) are used to work with information that means the methods, procedures and means such as computer, electronic diary, mobile phone and so on.

From a social point of view, information society is a society in which informatics and information and communication technologies are becoming an economic force, identifying and transforming the entire social system and acting as a means of creating new social, supraclass and and supranational structures fundamentally altering the mechanisms of social development (Horváthová, 2011).

Challenges of the information society and further directions of development have been the subject of a number of papers at international and national level. The following ones have an important role within the frame of documents of national character:

- Policy of Informatizing Society in the Slovak Republic for the years 2012 - 2015 with a view to 2020.
- National Action Programme of Society Informatization
- Millennium - National Programme of Education in the Slovak Republic for the next 15 to 20 years (10-13)

The main benefits of the information society are:

- making available the usage of information sources and their tools by the general public,
- expansion and improvement of means of services and entertainment,
- promotion of education,
- new opportunities for the application of human creative abilities, as well as the employing of handicapped people in life through "teleworking"

- increasing of cultural traditions and identity of regions,
- more efficient state administration,
- more effective management of enterprises, improving of competitiveness, facilitating of connection between the manufacturer, service provider and the customers themselves,
- new services in the telecommunications and new markets in field of software,
- more effective health care (Szókö, 2010).

Information Society was firstly taught at the J. Selye University in winter semester of the academic year 2019/2020. Since the subject of Information Society was not included in the accredited programs, the content of the course was divided into several subjects. The most of the topics was included in the basic subject of Information and Communication Technologies, taught in the first years of education at the Faculty of Economics of the Janos Selye University. Part of topics appears in the continuing subject of Information and Communication Technologies II. The subject of Informatics is taught only one semester at the Faculty of Economics so only four modules of Information Society are taught by means of presentations. Individual modules were evaluated on the basis of tests which had to be passed by all the students as the procedure within the exam. Tests were carried out in the Moodle environment where the teacher could exactly evaluate the different parts and process the percentage of success. Thematic unit on e-learning has found its place in the subject Didactics of Informatics, which is an organic part of the Master Teacher Training program. Thematic unit on legal standards of information society forms a part of the subject called Law and Ethics in the Use of Information and Communication Technologies.

6 Teaching modules

Demonstrate results of education in connection to content of education in singles teaching majors. Express forms, way and content of activity that students have to acquire beneath their studies. Part of educational modules are time support set for the given subject, aim of teaching, function of subject/module, specific steps, form and organisation of education, connection between subjects and didactic source.

Selection of tutorial

The main criteria for selection of the tutorial are the determining those factors, which mostly influences the achievement of educational aim. As the aim changes in the connection of social improvement, the opinion for the choice changes too.

Arrangement of tutorial

That in education don't occur don't wanted empty gaps, where is missing connection between, what is known and what has to be known, neither to don't reasoned duplication, it's need to correctly structuralize and sort the whole tutorial.

Subject system of education means the education of the given subject as a whole, while the sort of the tutorial is like spiral.

Modular system of education means education of the given subject divided to single parts – modules, while the sort of the given subject is modular. The tutorial is build up from modules.

6.1 Modular sorting of tutorial

Word module means in general as independent part (unit), which is complete, but which could be connected to another units and together with them create a bigger unit, supplying to rich wider aims, or the solution of more compounded tasks. So we can say, that module represents an independent unit of a puzzle.

In pedagogy expression module means the independent part of the tutorial, and modular sorting of tutorial means a tutorial of a specific type of school, course, etc., not divided into subjects, subjects divided into themes, but tutorial divided into modules. Time necessary for receiving the module of tutorial used to be

shorter, than the duration of the educated subject, about 15-40 teaching hours.

Expression modular system of education means expanded receiving the tutorial of the single modules, from which the school program is build up. Certain education – getting a certificate, diploma, etc., is understudied as a puzzle created from fixed number of modules. Successfully learned tutorial from a determined module is introducing the constant part of the puzzle – of the learning and it's not necessary in time, e.g. after some years, to learn again the same tutorial. (Szókö, 2010)

6.2 The necessity of realization the modular system of education

Quality is the measure of the perfection, preciousness, usefulness of the education and learning, fulfilling of requirement and expectations of the schools clients: pupils, students, parents, employees, citizens of the country. Quality of the education is able to continuously rise without consideration of the actual level.

Internally the subject informatics on the university is possible to reach only modularly, so all students can study only that, what they don't know. Different kinds of secondary schools have different standards, which students have to reach. There are big differences between the students, who are applying to universities from the area of informatics, and which affect the competence and practical abilities from the enfaced area. Wherever in this area are existing standards, which influences the level of information ability of the senior, in the most cases the knowledge of the students, which are starting the first year on the university, are not reaching this standard. The reasons of these imperfections are different. One of the reasons could be the kind of secondary school, as the level of teaching information and communication technology (ICT). Next reason of the big difference, that not all of the students has connection to these disciplines, and from a lot of students is missing the motivation. The first two reasons we can classify to external conditions of education, which are closely connected with the preparedness of the school, which is concerning with the tooling of material-technology basics and preparedness of the students. The material and technology tooling of the education is the question of the finance, and in a short time it could be changed from the nought to above the average. With the preparedness of the students, it is not so easy. It could be possible, that the different knowledge of the students, coming to universities, will be a problem for a long time. That's why it could be a good solution the modular system of education informatics – teach somebody that, what he doesn't know with a help of cloak test.

For ensure of the informational knowledge on single levels, the educational programs contains basic and special subjects oriented for computing, informatics and information communication technologies.

6.2.1 Subject system of education on the PF of UJS in Komarno

On the Faculty of Pedagogy of UJS subject informatics is educated two semesters. The weekly schedule is the following: two hours of lecture and two hours of practice, so 56 hours of informatics for one semester. The winter semester is divided into 14 weeks, and each week has different determined contain of lectures as practices too. This contain of the subject must finish all students in the first class on PF of UJS, wherever their abilities reached on the secondary schools are respected.

7 An offer for modular system of education on the PF UJS in Komarno

To avoid redundancy in the education process, and that all students could make connection between the present studies and studies before about informatics was created the modular system of education of this subject, wherever the main attention is on the type of finished secondary school. Every type of secondary

school has an elaborated standard from the subject informatics, which students have to reach.

Modules, which providing as a over to education in modular system way, has particular determined instructions to education, introduction, aims of the module, contently and effect standard, tutor text, summary, auto test, extra literature, ending and bibliographic links.

Modular system of education containing from 5 modules, where modules 1,2 and 3 are educated in the first – winter semester on the PF of UJS and modules 4 and 5 in the second – summer semester. Each module contains about 20 hours – together for one year it is 104 teaching hours. In the beginning of the first semester students works out an entering test, which is out worked modularly, and by the results they sing up for the module, which they don't know.

Offer for the content and aim single modules

Educational support of modules are divided and structured, that the learning of the participants would be maximally effective. Affectivity mainly is on, that participant could concentrate on the learning content, because he's not occupied with the study, because the study text contains elements which accelerate the right auto regulation. Participants after the signing up to the subject (course) get the study material.

The input diagnostics of the module – lector with the help of diagnostic dialog and cloak test conclude the knowledge and ability of the student. If it's need to the lector define an individual task (or more), which participant of the course solve and send in electronic way to lector for evaluation. With this way it will be ensured the comparable level of incoming knowledge and abilities of the participant and established a requirement for successful absolving of the course.

7.1 Methods

One of the parts of the tutorial process is feedback of the students. In consideration of, that students after the cloak test will be divided into groups, test could be anonym. The questions was selected based on them practical usefulness for the valuation of modules and according to standards for the standard high schools worked out by pedagogic institution.

In the beginning of the semester students get two types of tests. First test is dealing with the basics of the information, about the finished secondary school, number of hours from informatics weekly, as basic knowledge about the subject. The second test is divided up to 5 modules, where students must to answer for questions, wherever all of the questions has value of 1 point. By the results, were worked out individual studying plan for students, by which they visit the hours. In the end of the semester they must to take the same test – cloak test, where was checked the affectivity of the teaching process and reached knowledge from the semester, and than they were compared with the first – cloak test.

8 Results and Discussion

Content of Informatics as a Subject

The content of Informatics as a subject is, in a manner of speaking, regularized by the content of ECDL (European Computer Driver Licence), colloquially called as "a driving licence for PC". ECDL is an internationally respected, objective and standardized method to verify computer literacy. The ECDL methodology finds out by means of practical tests whether the candidate is able to use efficiently the basic information technologies. *The ECDL Certificate* – an internationally accepted document shows that its holder disposes of basic theoretical knowledge and has basic skills for universal and efficient using of computational technology. Its validity is unlimited as for time.

The ECDL syllabus covers entirely 7 modules. The content of these modules is the following:

1. The grounds of information technologies
2. Use of PC and file administration
3. Text editor
4. Chart calculator
5. Databases and database systems
6. PC graphic possibilities and ways of electronic presentation
7. Information network services

Given the specialization of students at UJS Faculty of Pedagogy, working with the chart processor Excel is reinforced. It is only the chart processor that is a means of teaching a whole series of technical subjects for economists. This is why it is important to master it thoroughly. The same applies to databases and database systems that constitute for economists an independent subject.

8.1 An effective provision of basic user's competences in the field of ICT – model of modular and adaptive preparation

It is an actual problem of every university to effectively realize and organize an acquisition of basic user's competences. How to realize an individual approach and differentiate at the same time is not easy. It is not simple to teach everyone what s/he does not know and not leaving out anything important, to pay everyone enough attention, to have time for everyone, to inspire everyone, to guide correctly, to lead to systematic work in order that everyone can gain the necessary competences and acquire a necessary level of knowledge.

Basic user's competences consist of theoretical knowledge, but mainly of skills how to use information and communication technologies (Szarka- Brestenská- Juhász, 2015). The content of the subject in each semester is 13 teaching units and each teaching unit has a precise content and specific educational aims. The students are drawn up an individual study plan upon their results of their entrance exams as a recommendation which classes to attend, and are given tasks to work out independently. The results of the tests will furthermore determine which and how many times thematic / teaching units will be repeated.

It is not compulsory for the students to attend lectures, nor seminars. The important factor is to meet the prescribed requirements for knowledge and skills. A proof of the knowledge and skills attained are the tasks worked out "at home", outside the scheduled education, and a successful handling of the test and practical tasks at the exam. The students may enrol at the exam, although they have not attended lectures or seminars. Upon their requirements and self-recognition, the students may develop their own individual study plan. If they do not accept this responsibility, the teacher subsequently recommends an "optimal" study plan according to their results at the entrance exam. The students may choose whether to respect such a study plan or not. As attending the lectures is not convenient for the students, they may compensate them with self-studying when the student solves the tasks assigned by the educator. The tasks are defined the way that by solving the tasks, the students are able to prepare themselves for a successful performance at the exam.

An Example of Model Realization

In the first year, there are 250 students, for example. If of them we created groups of 20 students (given the number of the computers in one classroom), we would get 13 groups. It would mean 13 x 2 teaching hours, that is, 26 hours a week altogether). Having evaluated the entrance exam, we have got the requirements for realization of teaching units, as shown in the following chart.

Table 1: An Outline of Necessary Teaching Units for Planning

Theme	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Need:	69	78	110	200	212	232	182	167	152	211	176	128	121
Need not:	181	172	140	50	38	18	68	83	98	39	74	122	129
Number of teaching units:	3	3	6	10	11	12	9	9	8	11	9	7	6

A total number of necessary teaching units is 104. For one week in case of a 13-week semester, it is needed to plan 8 teaching units, that is 8 x 2 hours, 16 hours a week altogether. 8 teaching units a week are planned centrally. Each student is given his or her individual plan and enrolls at teaching units alone. After the enrolment of students, the teacher knows exactly who is going to attend the particular teaching hour.

9 Conclusion

At the example stated, we may see that by way of a good work organization and efficient planning, it is possible to decrease the requirements for the number of contact teaching units in the education ICT. The students, anyway, learn what they do not know yet, where a teaching unit and its activities bring them the new knowledge and complement or create the missing competences. In order to gain the necessary skills in the field of using PC and ICT, attendance and active work at seminars is still not sufficient, but it is inevitable to incorporate these elements into everyday life and take advantage of their services to solve common tasks and problems. The students have at their disposal a whole series of suggestions and ideas for solution to check their knowledge, train and gain the necessary skills.

With respect to, that the transformation of subject system of teaching to modular system of teaching belongs to the most actual themes in the university system, the main benefits will be:

- Working out modular system of teaching of informatics in theoretical field, as in practical realisation too.
- With the survey we have find out, that the launch of the modular system of teaching is reachable with individualisation of preparing students in big quantities and finally rationalisation of the teachers work and reach higher affectivity of the teaching process.
- Launching the modular structure of content and adaptive method of teaching subject of informatics will save the needed number of contact hours of the teaching hours. It follows that the requirements for the classrooms technique will be fewer.
- The chance to use the teaching method "learning by doing" as the compensation absolving the contact hour.
- The number of needed direct teaching hours will be decreased 38%. Single thematically wholes probably will have different replacement in the time plan of teaching process.

In the validation process of the modular system of teaching it's need to work with the process of cloak motivation, with the process of rating and classification of single modules with the process of exposition of the new tutorial, with the process of defining the home work.

In the beginning of the semester its need to find out, the level of the students knowledge in the first class on the Faculty of Pedagogy of UJS in the area of informatics, and its need to find out their requirement and their preferable learning style.

By introducing the modular content structure and an adaptive way of teaching Informatics at the J. Selye University in Komárno, we assume that the number of necessary direct teaching hours will be reduced minimally by 40%. Separate thematic units will probably have a different.

Literature:

1. Bendíková, E.: Lifestyle, physical and sports education and health benefits of physical activity. In *European researcher: international multidisciplinary journal*. Sochi: Academic publishing house Researcher, 2014. Vol. 69, no. 2-2, pp. 343-348. ISSN 2219-8229.
2. Benedek, A.: *Visuality as a tool for expanding learning*. In: António Moreira Teixeira, András Szűcs, Ildikó Mázár (eds.), 2015 Annual Conference. Barcelona: European Distance and E-Learning Network (EDEN), 2015. pp. 3-8. ISBN:978-615-5511-03-5
3. Bilčík, A.: *Podpora záujmu žiakov a ich spokojnosti s vyučováním na stredných školách*. In: Berková, K., Krpálková Krelová, K. (eds). SCHOLA NOVA, QUO VADIS? 3rd International Scientific Conference. Praha: Extrasystem Praha, 2018. pp. 31-36. ISBN 978-80-87570-40-1
4. Golnhofer, E.: *Pedagógiai értékelés*. In FALUS, I. 2003. *Didaktika*. Budapest: Nemzeti Tankönyvkiadó. pp. 385-417. ISBN 978-963-19-5296-4
5. Horváthová, K.- Szőköl, I.: *Kontrola a hodnotenie žiackych výkonov v národnostných školách na Slovensku*. Monographiae Comaromienses 9., Komárno: Univerzita J. Selyeho 2013, 120. p., ISBN 978-80-8122-083-8.
6. Horváthová, K.: *Súčasná požiadavky na proces riadenia škôl a prípravu školských manažérov v Slovenskej republike*. In: *Otázky koncepcie prípravy riadiacich zamestnancov škôl*. Nitra: PF UKF Nitra, 2011, pp. 9-47. ISBN 978-80-558-0001-1.
7. Hradzilová Bočková, K. - Gabrheľová, G. - Porubčanová, D.: *Game Theory as a Tool of Conflict and Cooperation Solution between Intelligent Rational Decision-makers in Project Management*. In: *International Journal of Economic Perspectives*. Vol. 10, no. 4, 2016, pp. 147-156. ISSN 1307-1637
8. Hrmo, R. – Podaril, M.: *Introduction of Quality Management Systém for Vocational Education and Training in Slovakia* (elektronický dokument). DOI 10.3991/ijep.v3i3.2733. In: *International Journal of Engineering Pedagogy*. Viedeň: International Association of Online Engineering, 2013, Vol. 3, no.3, pp. 18-23 (online) ISSN ((online) 2192-4880, WoS
9. Kolar, Z., Vališová, A.: *Analýza vyučování*. Praha: Grada Publishing. 232 p. ISBN 978-80-247-2857-5.
10. Kostrub, D.: *Dieťa/žiak/študent – učivo – učiteľ, didaktický alebo bermudský trojuholník?* Prešov: Rokus. 2008. 169 p. ISBN 978-80-89055-87-6.
11. Krelová, K. – Vašková, L.: *How to increase efficiency of technical education*. In *CO-MAT-TECH 2003*. Bratislava: STU, 2003. ISBN 80-227-1949-8
12. Marks, I. – Lajčín, D.: *Anton Štefánka a slovenské školstvo v medzivojnovom období – vybrané problémy*. Brno: Tribun EU, 2017. 119 p. ISBN 978-80-263-1362-5.
13. Marks, I. – Lajčín, D.: *Moderná škola v ponímaní Antona Štefánka*. In *Paidagogos: časopis pro pedagogiku v souvislostech*, Vol. 2016, no. 2. 2016, pp. 125 – 140. ISSN 1213-3809.
14. Nagy, M. – Horváth, K. – Szabóová, E. – Kanczné Nagy, K.: *Elsőéves hallgatók véleménye a tanári kompetenciákról körében. Új kihívások és pedagógiai innovációk a szakképzésben és a felsőoktatásban*, A VIII. Trefort Ágoston Szakképzés- és Felsőoktatás-pedagógiai Konferencia tanulmánykötete, 2018. pp. 56-65. ISBN 978-963-449-148-4
15. Porubčanová, D.: *Analýza rolí profesie vysokoškolského učiteľa* In: *Vzdelávaní dospelých 2017 – v době rezonujících společenských změn: proceedings of the 7th International Adult Education Conference*. Praha: Česká andragogická společnost, 2018, pp. 245-255 [print]. ISBN 978-80-906894-2-8.
16. Porubský, Š.: *Prezentácia o rozvíjajúcom hodnotení*. Žiar nad Hronom: Nadácia Škola dokořán, 2000.

17. Porubská, G.: *Aktuálne problémy slovného hodnotenia na 2. stupni ZŠ*. In: Slovné hodnotenie na druhom stupni základných škôl: Zborník príspevkov z vedeckej konferencie Nitra: UKF, 2000. pp. 101-108 ISBN 80-8050-320-6.
18. Prokypčáková, K. - Malá, D. - Porubská, G.: *Celoživotné vzdelávanie ako cesta ku znalostnej spoločnosti (skúsenosti PF UKF v Nitre) /*. Bratislava: Eruditio, spol. s r.o., 2006. - 64 p. - ISBN 80-88954-37-1.
19. Prucha, J.: *Moderní pedagogika*. Praha: Portál, 1997, 480 p. ISBN 80-7178-170-3.
20. Szarka, K.: *Súčasný trendy školského hodnotenia: Koncepcia rozvíjajúceho hodnotenia*. 1. vyd. Komárom: Kompress, 2017. 147 p. [5,76 AH]. ISBN 978-963-12-9692-1.
21. Szarka, K.- Brestenská, B. – Juhász, Gy.: *Analýza aspektov hodnotenia autentických výstupov a komplexného monitorovania žiackych prác v chémii*. In: Didaktika chemie a její kontexty: 24. Mezinárodní konference o výuce chemie. Brno: Masarykova univerzita, 2015, CD-ROM, p.200-208. ISBN 978-80-210-7954-0.
22. Szarka, K. – Brestenská, B.: *Nové prostriedky hodnotenia procesu vzdelávania študentov vo vyučovaní chémie*. In: *Aktuálne trendy vo vyučovaní prírodných vied*. Trnava: Pedagogická fakulta Trnavskej Univerzity v Trnave, pp. 362-367. ISBN 978-80-8082-541-6.
23. Szököl, I.: *Educational evaluation in contemporary schools*. Szeged: Belvedere Meridionale, 2016, 159. p., ISBN 978-615-5372-60-5.
24. Szököl, Š.: *Modulárny systém výučby informatiky*. Komárno: Univerzita J. Selyeho 2010, 100. p., ISBN 978-80-89234-97-4.
25. Šenkár, P.: *Súradnice básnickej polyfónie Slovákov v Rumunsku*. Nadlak: Vydavateľstvo Ivan Krasko, 2016. 219 p. - ISBN 978-973-107-116-9
26. Škoda, J., Doulik, P.: *Psychodidaktika*. Praha: Grada. 178 p. ISBN 978-80-247-3341-8
27. Ugrai, J.: *The Highs and Lows of Reform. The Divergent Development of Public Education and Teacher Training in Hungary*. In: Foro de Educación. 2016. Vol. 21. pp. 39-57.
26. Ugrai, J.: *Going on Their Own Way. Protestants' Specific Models of Joining the Cultural Elite in 19th-century Hungary*. In: Espacio, Tiempo y Educación. 2020. Vol. 7 no. 2. pp. 119-133. doi: <http://dx.doi.org/10.14516/ete.243>
27. Vass, V.: *Creative School: Renewing Leadership for Creativity*. In: Tadeusz Marek, Waldemar Karwowski, Marek Frankowicz, Jussi Kantola, Pavel Zgaga (eds.): *Human Factors of a Global Society: A System of Systems Perspective. Education in Modern Society*. CRC Press, Taylor and Francis Group. Florida, US. 2015. 969-974.

Primary Paper Section: A

Secondary Paper Section: AM

FORUM THEATRE AND THE TEACHING PROCESS

^aLADISLAV TISCHLER

Constantine The Philosopher University in Nitra, Faculty of Education, Department of Music, Dražovská 4, 949 01 Nitra, Slovakia
email: ^altischler@ukf.sk

Abstract: This paper presents a theatrical technique called *Forum Theatre and its Use in The Teaching Process*. Forum Theatre is a name for an interactive stage technique often used in the educational process. The world-renowned method, based on the dramatic techniques of August Boal, is characterised by the fact that the audience become actors and are thus confronted with the reality that takes place on the stage. This staging method is commonly used in modern teaching concepts all around the world and is one of the key methods of creative drama. It enables people to experience, analyse and subsequently understand dramatized situations in everyday life and thus improve not only the educational process, but especially mutual communication

Keywords: theatre, teaching, education, creativity, critical thinking

1 Forum theatre and the teaching process

It is essential to find connection between different disciplines, be able to creatively combine and bring new solutions and ideas in the shortest time possible so that the teacher can respond quickly to a constantly changing society and is able to bring and interpret new, up-to-date, and interesting information.¹ According to Nicholson, young people are now often in a complicated situation, being attacked by different emotional connections, beliefs and value systems. Access to social networks, multiple sources of information and mediated images make their adolescence more difficult and disturbed by constant uncertainty.² A teaching process must not go against this trend, but take this as a starting point instead. It should be assumed that contemporary society determines not only trends in theatre, but also in, for instance, the management of lessons. Increasing pace or in other words dynamics of society causes a constant flow of information. The teacher's task is to teach students to classify this information and to form their own attitude towards it. New trends and methods are constantly coming to guide the educational process so that it is as attractive as possible, but in practice their application usually does not work. Ken Robinson suggests that young people should be given the opportunity to develop their own creativity and learn to better adapt to the changing social and economic conditions they have to face.³ Since ancient times, production of theatre plays has served as a tool to make a text accessible. Consequently, it was easier to understand the text in a visual form which enhanced the intellectual level of the nation. Theatre offers the opportunity to put students in a model situation from real life, in which they will have to make decisions and bear full responsibility for them. This unrealistic situation allows the teacher to provide students with a detailed analysis of a conflict, relationships and possible responses to students' actions in the situation. Forum Theatre is a name for an interactive stage technique often used in the educational process. It is interpreted in the form of a compact performance, which presents the audience with attitudes to various problems, gives them the opportunity to realize their position and possibly change it.⁴ The world-renowned method, based on the dramatic techniques of August Boal, is characterised by the fact that the audience become actors and are thus confronted with the reality that takes place on the stage. This technique is extraordinary because the audience can directly

interact with the performance on the stage, change it as well as the fate of characters. *Forum Theater also extensively focuses on the individual and their personal mental set-up, blocks and issues, which helps them to overcome and strengthen their self-esteem and self-reflection in a non-violent way.*⁵ Not only does it develop the creative and critical thinking of the audience, but it teaches them to be empathic and assertive, and can lead to an objective solution of problematic tasks. An objective solution is an active search for so-called objective truth, which arises from the intersection of different perspectives on the issue. This staging method is commonly used in modern teaching concepts all around the world and is one of the key methods of creative drama. It enables people to experience, analyse and subsequently understand dramatized situations in everyday life and thus improve not only the educational process, but especially mutual communication.

In his publications,⁶ Boal divides the staging of the Forum Theatre into *three phases*. The first is based on a group work using exercises and games. It is very important for the participants in the creative process because they make their first contact with each other. Individual exercises are designed to eliminate initial fear of the performers. The games reinforce the dynamics of a group in which students learn to improvise and react readily to a new situation. Some of these exercises can then be integrated into the creative process. Bertold Brecht, and Konstantin Sergejevich Stanislavsky's acting exercises, and other dramatic activities are supplemented by the workshop participants themselves.

The book⁷ is divided into four chapters:

- Chapter – Feel What You Touch – to awaken movement, balance and touch.
- Chapter – Listen to What You Hear – to learn receiving tones and rhythms.
- Chapter – Awakening Different Senses – to practise senses without engaging eyesight.
- Chapter – Guess What You See – nonverbal communication.

Individual games are aimed at preparing students (future actors and actresses). This author deals with the topic of the use of music and drama performing activities in more detail: SONDOROVÁ, D. 2019. *Music and drama based activities, their use in the technique Forum Theatre* (In *Teorie a praxe hudobní výchovy VI*. Praha: Nakladatelství Karolium. 2020, č. 6, p. 189-194). The use of the Forum Theatre technique is bound to the first phase.

2 Relaxation games

Zombie

The exercise is focused on relaxation, concentration, getting to know each other in the group and cooperation. Students stand in a circle and gradually say their names or nicknames. The game begins with the identification of the first "zombie" who looks at his victim and proceeds to him until the victim says the name of another student. Then he stops and the player whose name was spoken comes to life. He chooses the victim and goes to him again. The "Transfer of the zombie" continues until the victim makes a mistake. Then the player loses his life and can no longer continue in the game. The game continues until the last three players remain.

¹ One option is to link art education with information technology. Under the influence of COVID-19 measures, current education has been moved to the online environment for almost a year. This fact influenced not only the way education is implemented, but also the creation of new software for art education. See, for example, research and development of Albrechtic software for teaching music theory for all levels of music and music-drama education: VOZÁR, M., ČIERNA, A., BREZINA, P. 2020. *Albrechtic - A Modern Didactic Tool for Teaching Music Theory*. In TURČANI, M. et al.: DIVAI 2020 : 13th International Scientific Conference on Distance Learning in Applied Informatics, Štúrovo September 21-23, 2020, 1. vyd. Praha: Wolters Kluwer, 2020, pp. 245-250. ISBN 978-80-7598-841-6. ISSN 2464-7470.

² NICHOLSONOVÁ, H. *Divadlo a vzdelávanie*. Bratislava: Divadelný ústav, 2010, p. 27.

³ NICHOLSONOVÁ, H. *Divadlo a vzdelávanie*. Bratislava: Divadelný ústav, 2010, p. 61.

⁴ MATYAŠOVÁ, L. 2005. *Divadlo fórum na školách žije*. In *Tvorivá dramatika*. 2005, č. 3, p. 15.

⁵ SONDOROVÁ, D., GÁLISOVÁ, L. 2019. *Forum theatre as a means of risk youth resocialization*. In *Ad Alta: Journal of Interdisciplinary Research*, 2019, vol. 9, issue 2, p. 44.

⁶ See BOAL, A. 1995. *The rainbow of desire: the Boal method of theatre and therapy*. New York: Routledge, 1995. 216 p. ISBN 0415103495, and too BOAL, A. 2002. *Games for actors and non-actors*. New York: Routledge, 2002. 336 pp. ISBN 0415237080

⁷ BOAL, A. 1995. *The rainbow of desire: the Boal method of theatre and therapy*. New York: Routledge, 1995. 216 p. ISBN 0415103495

Game with sticky notes

This game is designed to develop analytical thinking, students learn to ask the right questions, which supports the development of perception of the character's nature. Players in the group are sitting in a circle, each of them receives a blank piece of paper on which they write the name of a famous person or movie hero. Everyone sticks a sticky note on their partner's forehead without showing them the name. Everyone gradually asks questions to reveal the identity of the person written on their forehead. The questions must be formulated in such a way that the members of the group can only answer yes or no. If the answer is yes, the player may ask another question, if the answer is no, then the player on the right continues. The game ends when everyone discovers their 'true' identity.

In the sense of this word

One player from the group leaves the room, the rest of the players agree on some trait, emotion, or character feature, for example, nervous, distrustful, polite, angry, optimistic, rude, kind, selfless... The player comes back to the room and asks others to perform an action "in the sense of this word" (for example singing a song, writing a letter, calming a child in a baby carriage, performing a few simple exercises, speaking to a neighbour) to guess the trait, the emotion or character. The player whose acting is guessed correctly as the 'word' leaves the room and the game is repeated.

The second phase is focused on the development of staging thinking using theatrical images. A photograph or an image is basically a captured situation of everyday life. It can be easily transferred to the stage in 3D form and through the nature of characters and their relationships, students learn to develop stage thinking. Each situation has its logical structure, which is determined by its basic conflict. The construction of a theatrical image is determined by given circumstances (everything that affects the characters at a given moment), which secondarily influence the behaviour of individual characters. A teacher can revive the displayed image and move it freely forward or backward in time. Students learn to understand the relationships between characters, their nature and can name a primary conflict and circumstances that affect their actions. They are ready for the last phase when they understand the correlations of individual parts of a theatrical image.

Exploring space

One of the tasks is to teach students how to move in a space, what is appropriate for classical theatre space, what means of expression, movement and intensity of voice to choose in a given space. The teacher explains the difference between performing on the "big" stage and performing in a space that is in direct contact with audience. During acting lessons, students must not focus only on classical theatre space so the teacher intentionally changes the place of production of their etudes during the exercises, delimits and subsequently abolishes the boundaries within which the students move. They must be able to adapt their performance and be able to respond to any change in a space because they will often encounter an unconventional and irregular space in their future profession. The simple exercise is based on free movement of students in the space, recognizing it so as not to endanger or restrict the members of the group. Students must concentrate and feel their partners so they have the same tempo-rhythm. Then the teacher intervenes and he arbitrarily changes the pace of the group, conditions and rules of students' movement in the space. Students then vary their movement. The cooperation of the group and the perception of the space are important.

Improvisations

Students are divided into two or more teams that compete with each other. Each group has to come up with ten movie titles or books. One member from each group is selected by turn and assigned one of the fictitious names. Within the time limit, he must pantomimically or by movement present it in such way that members of his team guess the correct answer. If he succeeds, his group scored a point, if not than the opponent scored the point. The game continues until there are no movie titles left.

Improvisations are very important in the beginning of students' work because they teach them how to react quickly to the situation, to deal with tempo-rhythm, spatial feeling, they learn the basics of acting and develop their creative thinking. The teacher needs to create a relaxing atmosphere before the exercise which is very important at the beginning of improvisation. There is a principle – the looser the atmosphere, the better students are prepared for improvisation. The teacher explains the basic rules of improvisation after the initial attempts. Based on improvisational exercises, students begin to actively work with the tempo-rhythm and rules of stage composition. It moves on from individual to group improvisations in which students learn how to react to a chosen theme at a given moment with respect to the group, maintaining the theme, story and dramatic arc so that their actions lead to a point. The teacher can diversify the lecture with theoretical knowledge of improvisation in the Renaissance *Commedia dell'arte*.

Storytelling and its variations

The creative team is divided into pairs. They will be given the task of remembering a funny story. The members of the pair tell each other stories. The next part of the exercise continues on stage – the first member of the pair tells his authentic story and the second member waits outside. After the first narration, the second member of the pair tells the story as he remembered it, but he can also use his imagination as much as possible when narrating. The students' task is to recognise which of stories is original. They analyse stories and point out what interested them. Then the teacher analyses with them the structure of story, phenomena that create plot, tempo-rhythm, storyline, creating the plot and points.

The third phase is staging a Forum Theatre. The whole process starts by selecting a theme. Content elements are called theme (leading ideas, images, leitmotifs, what is being discussed). The motives for the action of characters are abstract and universal terms (for example, the motive of betrayal). Unlike motives, themes are specific and individual (for example, the theme of Faidra's betrayal of her husband).⁸ The right choice of the theme is an extremely important point, as it determines the whole direction of the staging in space. The choice of a theme affects social status, but mainly current issues that bother a selected group of students. A theme should therefore reflect a new or latent issue of the society which the specific group of students is a part of. This author, for example, deal's with the increasingly current topic of cyberbullying, mediated through the forum theater: HUBINSKÁ, Z. 2020. *Forum Theater and Movement* (In Ad Alta: Journal of Interdisciplinary Research, 2019, roč. 10, č. 2, pp. 146-150). Its intention was to present this sensitive topic to young people, to show them what their actions can cause and how to prevent inadequate behavior. Students usually choose themes they know well from their family or school, which allows them to have a closer relationship to the chosen situation. This applies not only to the engagement in creation, but also in relation to the characters which they will then portray more truthfully. An idea comes from the selection of a theme. An idea speaks of a message to be delivered to the audience through a performance. The second step is to prepare a script. In this phase, it is not only the students' creative thinking that develops, but they also learn to name the conflict precisely, its climax, the very path to the conflict, its consequences, and possible solutions. When preparing a script, it is necessary to name breaking moments of the story, which can reverse its direction, name the main characters and describe their basic characteristics. One of the rules of Forum Theatre is that the main character must turn out badly. It is important to point out the significance and the role of each character in building the theme of the whole production. Students and their teacher the first draft of the script. The teacher can choose an improvisation method to create a text template in this part. *There are different levels of improvisation: making up a text based on a familiar and quite an accurate outline (as in commedia dell'arte); or solely based on an agreed theme or construction; a completely original gesture and verbal*

⁸ PAVIS, P. *Dictionnaire du Théâtre*. Paris: Dunod, 1996. p. 411.

*idea created without a previous pattern in physical expression.*⁹ This method requires thorough previous preparation of the students. The next part is the staging in which individual situations are visualized in space. The teacher can approach the staging in several ways, but usually uses material from the preparatory part of the staging. They can use the 3D image method that they had tried in the second phase, the improvisation method, or a traditional arrangement of individual theatrical images for the visualisation. Simple staging principles are usually used. That means a basic costume, a simple scene and a musical component which has no story-forming character. Expressive elements must be simple. This will reinforce the informative value of the whole production and the audience will be focused on the conflict and theme. After this part the teacher manages the completed theatre production.

Before creating the script, students should learn how to effectively obtain relevant information about the topic. It is necessary to know all available information about every topic we want to try to produce. During the creation of the script, it is important to choose the basic plot facts, to work out the structure of the staging, in which conflicts and individual theatrical images are named. After that, students can be divided into creative teams. Each team will receive a scene in which they must describe in detail all the actions and, if necessary, come up with lines for individual characters. Then they present their studies to each other, and if the creative team has agreed to the proposal, the scene is added to the script. Otherwise, the proposal is returned to completion. In order for the project to be successful, it is important to identify and select the actors who, from a physiological and psychosomatic point of view, are most similar to our idea of the characters in the staging. Every actor has certain dispositions that predetermine him for certain types of characters. During the preparation for the staging of Forum Theatre we can describe every character who can intervene in the story and give it a work name. Then the creative team's task is to create biography and basic characteristic of individual performers. Each character will be assigned to an actor by comparisons. Actors name individual actions of their character, which result from dramatic text. Students analyse characters' reactions and motivations using prepared biographies and characteristics. Only after this inevitable theoretical preparation the actors start to learn lines of the play.

3 Performance in front of the audience

Forum Theatre is not a demanding production because of the use of simple expressive elements and thus it can be also realized in non-theatrical locations. The primary role of this theatre form is not its aesthetic aspect, but its informative value and subsequent interaction with the audience. The whole presentation consists of two parts. In the first part the audience is introduced to the performance and its theme, in the second part the audience play the main role. After the introductory part, the teacher takes over the action and together with the audience names the fundamental conflict. There is a controlled discussion, in which the conflict situation is analysed – the reasons for its occurrence, the characters' actions and their relations to the problem are named. At this stage, the individual protagonists who defend the characters' actions and thus help to better understand the situation are also involved in the discussion. After a basic analysis, the audience in cooperation with the teacher identify the causes of the conflict and propose solutions that would prevent it from occurring. The performance takes place again, and the audience is free to stop it when they feel that changing a character's behaviour in a particular situation would prevent conflict. A solution is proposed, and it is then applied in the performance. In this way, the audience has the right to enter and change the story. The action of the main character or the others may be changed. An important rule is that the nature of the characters must not change during the performance. The proposed change is included into the performance, which is then performed. The audience can see how this change affects a conflict situation. Audience can also enter the

staging process in a second way by replacing a performer, performing in the situation themselves and trying to change it in the ongoing process. Once performed, the audience is again asked to interact and rate this change. The audience can intervene in the performance and change the character's response until the conflict situation is prevented or its effects are mitigated. The whole staging ends with the final evaluation by the teacher and the audience. This theatre form carries a process that is constantly multiplying. The staging phase teaches the audience to think critically and creatively, but their knowledge is enhanced in practice only when it is introduced.

The format, which is made dynamic by a continuous flow of information, forces us to reassess the functioning of a teaching process, in which not obtaining information but sorting and combining it should be a priority. Application of theatrical procedures to the teaching process can show students how to analyse and create new solutions in problem solving tasks. Students are taught to communicate and cooperate with each other. Nicholson concludes her publication, *Theatre & Education 2009*: "... *progressive elements in theatre-based education suggest that young people can actively create meanings and create theatre according to their lives, not just reproduce theatre as it exists.*"¹⁰ This article has no ambition to talk about finding a connection between theatre and the educational process as *Drama in Education* does, but it talks about theatre, which may be part of the educational process in *Education in Drama*. A key step towards making an educational process more attractive can be to realise the similarities of a lesson with the theatre performance and to apply the basic principles of staging. Teachers who are able to use the methods of the theatre performance will increase the attractiveness of their teaching unit and thus increase the efficiency of the teaching process itself. *One who encourages the development of children can stand proof of how people learn through playing and imitating. The child imitates reality and at the same time shows their view of the world. In children's games – as well as in theatrical play – there is a human urge not to accept reality as simply something given, but to "magically" transform it in a play through play.*¹¹

Literature:

1. BOAL, A. 1995. *The rainbow of desire: the Boal method of theatre and therapy*. New York: Routledge, 1995. 188 pp. ISBN 0415103495
2. HUBINSKÁ, Z. 2020. *Forum Theater and Movement*. In Ad Alta: Journal of Interdisciplinary Research, 2019, roč. 10, č. 2, pp. 146-150. ISSN 1804-7890
3. MATYAŠOVÁ, L. 2005. *Divadlo fórum na školách žije*. In Tvořivá dramatika, 2005, č. 3. 45 pp. ISSN 1211-8001
4. NICHOLSONOVÁ, H. 2010. *Divadlo a vzdelávanie*. Bratislava: Divadelný ústav, 2010. 79 pp. ISBN 978-80-89369-14-0
5. PAVIS, P. 1996. *Dictionnaire du Théâtre*. Paris: Dunod, 1996. 542 pp. ISBN 8088987245
6. SONDOROVÁ, D. 2019. *Hudobno-dramatické aktivity a ich využitie v technike Divadlo fórum*. In Teorie a praxe hudobní výchovy VI. Praha: Nakladatelství Karolium. 2020, č. 6, pp. 189-194. 368 p. ISBN 978-80-7603-163-0
7. SONDOROVÁ, D., GÁLISOVÁ, L. 2019. *Forum theatre as a means of risk youth resocialization*. In: Ad Alta: Journal of Interdisciplinary Research, 2019, roč. 9, č. 2, pp. 42-46. ISSN 1804-7890
8. VOZÁR, M., ČIERNA, A., BREZINA, P. 2020. *Albrechtic - A Modern Didactic Tool for Teaching Music Theory*. In TURČÁNI, M. et al.: DIVAI 2020 : 13th International Scientific Conference on Distance Learning in Applied Informatics, Štúrovo September 21-23, 2020. 1. vyd. Praha: Wolters Kluwer, 2020. pp. 245-250. ISBN 978-80-7598-841-6. ISSN 2464-7470.

Primary Paper Section: A

Secondary Paper Section: AL, AM

⁹ PAVIS, P. *Dictionnaire du Théâtre*. Paris: Dunod, 1996. p. 54.

¹⁰ NICHOLSONOVÁ, H. *Divadlo a vzdelávanie*. Bratislava: Divadelný ústav, 2010. p. 68.

¹¹ NICHOLSONOVÁ, H. *Divadlo a vzdelávanie*. Bratislava: Divadelný ústav, 2010. p. 61.

STRESS AS A RISK FACTOR IN THE FIREFIGHTER PROFESSION

^aMICHAELA BALÁŽIKOVÁ, ^bMARIANNA TOMAŠKOVÁ,
^cJÍŘÍ POKORNÝ

^{a,b} Faculty of Mechanical Engineering, Department of
Production Quality and Safety, Technical University of Košice,
Slovak Republic

^c Faculty of Safety Engineering, VSB – Technical University of
Ostrava, Czech Republic

email:^amichaela.balazikova@tuke.sk,

^bmarianna.tomaskova@tuke.sk, ^cjiri.pokorny@vsb.cz

Acknowledgement: This research was supported by APVV project No. 15-0351, Development and application of risk management models in the conditions of technological systems in accordance with the strategy Industry 4.0.

Abstract: Stress affecting humans over the long term can cause serious illnesses. It results from a lack of time, a lot of tasks, considerable responsibility and several other reasons that are perceived as a risk factor. In this paper, a method for assessing psychosocial risks was suggested. The suggested risk matrix method consists of two parameters: probability and consequence. To illustrate the assessment of the psychosocial risks of the firefighter profession, an activity was selected - the intervention of a firefighter in a traffic accident.

Almost every intervention puts their health and life at risk. For the purpose of health protection, all possibilities of risk situations that may arise in carrying out this work and may cause undesirable consequences are analysed.

Keywords: stress, firefighter, risk

1 Introduction

A human experiences stress when he feels an imbalance between the demands placed on him and the means at his disposal. Although stress is a psychological phenomenon, it affects a human psyche to a large extent. It is an organism response accompanied by adrenaline, other stress hormones, which manifest themselves as an increase in pulse and blood pressure, breathing, muscle tension, dry mouth, increased blood sugar and others.

There is no precise level of stress that is optimal for an individual because each person responds differently to different situations. Something that is a burden for one may be a joy for the other. Although it is not possible to clearly determine the optimum level of stress, in terms of the impact on human health, stress can be divided into negative and positive (OHS Framework Directive, 1989). Stress defined by Selye as a non-specific reaction of the body to every requirement it is exposed to. It is a condition when the organism is in an imbalance with itself and its surroundings (Macháč, Macháčová and Hoskovec, 1988).

The article analysed the stress at work of firefighters, burnout syndrome and more. The results revealed a relationship between stress and psychophysical exhaustion. In high-risk occupations, special attention should be paid to burnout prevention programs, health activities and psychotherapy (Makara-Studzińska, Golonka and Izdorzcyk, 2018).

Eustress (positive stress) is a reaction to a stress that is experienced as something pleasant. The stress reaction is accompanied by pleasant exciting feelings with pleasant expectations (Praško and Prašková, 1996).

Distress (negative stress) stress is a long-lasting negative burden, it appears where things cease to be handled, we feel overloaded, we lose confidence and detached view - workload (Praško and Prašková, 1996).

A stressor is a summary of events or circumstances leading to an individual's feeling that physical or psychological demands exceed his ability to cope with them (Marcinek, 2013).

The risks arising from the work of a rescue firefighter can be divided into two main groups, namely the workload and the working environment. The actual process of eliminating excessive psychological stress in firemen is divided into three

stages. The first stage consists of care and consistent removal of stressful situations from the work process. In this profession, a stressful situation cannot be avoided, but it is necessary to face it by preparedness and training, or by selecting those who are resistant to this type of stress. The essence of the second stage is to avoid the risk that acute stress reactions do not cause negative and long-term consequences on the health and working abilities of the firefighters involved. Here, social structures such as a psychologist and a work team are already intervening. Research results in Germany among 300 professional firefighters who reported having survived an extremely burdensome hit pointed to the fact that among stress management strategies, they use the interviews between firefighters themselves in practice. Reducing mental stress in common interviews can be more effective if the interview is conducted by a fire psychologist with a specific focus. The third stage of psychological care consists in psychological rescue. In cases where stress situations in the fireman persist for weeks, a so-called individual therapy starts (OHS Framework Directive, 1989). This article provides a review of the literature, where studies focus on workload and requirements for common firefighting tasks, the impact of health on the firefighting profession, and attempts to determine the minimum physiological capacity of the workload for successful performance firefighting. The existing literature provides information that firefighters are exposed to mental and physical stress during firefighting tasks. During their work, there is also physiological stress acting on the human body when wearing personal protective equipment when extinguishing a fire, which may affect the ability to withstand fire and the development of diseases as well as fire safety (Cody, Morris and Harish, 2018). Against the aggressiveness of the environment, it is necessary to protect the firefighter and ensure the important functions of his/her organism. Bodywork of firefighters, heat production multiplies, 90% involved muscles and skin, the rest shared with other organs 9% and the brain 1%. The skin surface contributes to the heat output. The expense is boosted when a heated layer of air is removed from the skin surface, e.g. by air flow, wind. The body's heat balance must be ensured by the fireman's personal protective equipment. In addition, these devices must protect the firefighter partially against environmental aggressions (heat flow, chemicals, sharp edges, bacteria, etc.). Significant factors that adversely affect the fireman are stress and mental stress at work. It should be emphasized that the aspect of mental demands is at the forefront.

Although firefighters are exposed to hard physical work during demanding actions, physical exhaustion is far from comparable to the psychological pressure that persists at different levels of consciousness, creating a kind of "pressurized mental vessel" and over the years can create an unmanageable problem (Cody, Morris and Chander, 2018).

2 Legislative regulations related to mental workload

Decree of the Ministry of Health of the Slovak Republic No. 542/2007 on details of health protection against physical workload, mental workload and sensory workload in Section 2 Paragraph 1 defines the mental stress.

Mental stress is a factor that represents the sum of all assessable impacts of work, working conditions and working environment affecting a person's cognitive, sensory and emotional processes that affect him and induce states of increased psychological tension and load of psychophysiological functions.

Mental stress is a factor that is burdensome for the organism and requires mental activity, mental processing and coping with environmental requirements and impacts, while:

1. The environment is understood as everything that surrounds a person, including the working environment, social ties, events, and behavioural requirements,

- The demands of the environment and work are greater than the individual's mental fitness, his/her work potential.

There are three forms of mental stress: sensory, mental and emotional. Sensory load results from the requirements for the activity of peripheral sensory organs and their corresponding structures of the central nervous system. Mental load arises from information processing requirements that impose demands on mental functions and mental processes, such as attention, imagination, memory, thinking and decision-making. Emotional load results from requirements triggering an effective response (Marcinek, 2013).

3 Algorithm of psychosocial risk assessment

Psychosocial risks at the workplace can be assessed according to the following seven steps:

- Preparation - data collection.
- Identification of stressors and intensity of their occurrence.
- Estimating the risk according to the severity of stressors (estimating the probability and severity of the stressors' effects on the health, error rate and performance of the employee and determining the magnitude of the risk).
- Reducing the effects of risk stressors at work, considering their severity, documenting risk assessments.
- Implementation of the proposed measures.
- Repetition of psychosocial risk assessment.
- Evaluation - there is proposed in the Figure 1 an algorithm for assessing of psychosocial risks causing stress to employees at work is proposed. After identifying the hazard (stress), the risk must be assessed by determining the risk parameters for each individual hazard.

The risk is derived from a combination of the following relevant parameters:

- severity of the damage and its consequences,
- likelihood of such damage occurring,
- likelihood of an adverse event,
- technical capabilities and human capabilities to prevent or to avoid risk.

To estimate the magnitude of psychosocial risk at work, a risk matrix needs to be developed. Categories of the probability of the occurrence of an adverse event - mental workload, expresses the intensity of the occurrence of stressors, which were evaluated based on the checklist as existing stressors - causing mental workload. The stressor intensity categories, express the severity of possible damage to health, the number of human errors/injuries, and the reduction in employee performance. The resulting risk matrix for the assessment of mental workload is in Table 1 and 2.

Figure 1 Proposed algorithm for psychosocial risk assessment

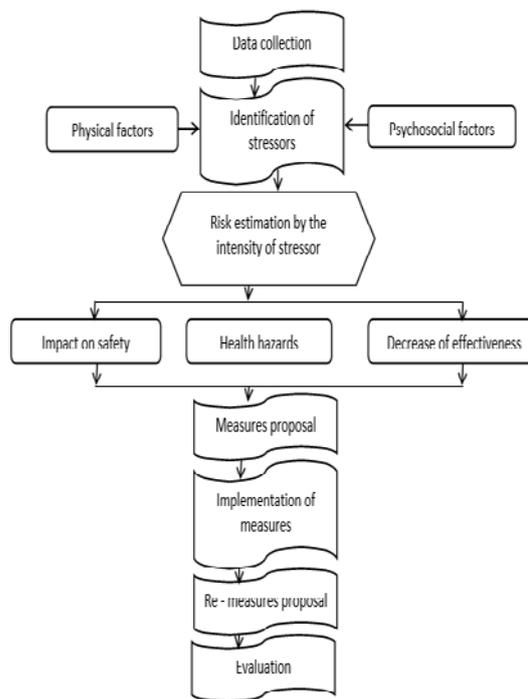


Table 1 Risk matrix for mental workload assessment

		Probability			
I.		Rarely, unlikely			
II.		Occurs regularly, probable			
III.		Permanent occurrence during activity, very likely			
		Consequence			
		Health hazard	Human error/injury	Decrease of effectivity	
A		Short-term increase of tension in the organism without health damage	Sporadic occurrence of errors (almost accident)	Short-term decrease of effectivity	
B		Explosiveness, aggression, possible disease	Increased number of errors (sick leave over 3 days)	Prolonged decrease of effectivity	
C		Depression, severe mental health conditions, possible long-term health damage	High error rates (sick leave more than 42 days or death)	Permanent work disability	
Risk matrix for mental workload assessment					
		A	B	C	Low risk - no action required Medium risk - measures must be taken to eliminate psychological threats High risk - it is not possible to work in these conditions, immediate corrective action is required
I.		Low risk	Low risk	Medium risk	
II.		Low risk	Medium risk	High risk	
III.		Medium risk	High risk	High risk	

Source: own calculation of Balážiková

Table 2 Form for psychosocial risk at work assessment

Mental workload assessment											
Job positions:						Assessed by:					
						Date:					
No.	Threat-stressor	Health threat			Human error/injury			Decrease in performance			Measures
		P	D	R	P	D	R	P	D	R	

Source: STN EN ISO 12100:2011

4 The effect of stress on the psyche of firefighters

Table 3 describes the traumatic events, in which the post-traumatic interventional care is provided (Marcinek, 2013). The analysis shows how the environmental, physical and emotional stresses to which firefighters are exposed in their work activities can lead to occupational hazards, accidents or even fatalities. Psychological reactions can be caused by fatigue and could endanger the health and the safety of firefighters. It is recognized that an increase in body temperature leads to a decrease in physical and mental performance. In addition, a physiological decline related to age could be expected during the working period of firefighters. Adequate physical fitness programs and regular physical fitness assessments are needed to ensure that physically fit personnel perform this profession. Adequate financial investment to assess and increase the physical abilities of firefighters could effectively reduce the health risks associated with emergencies (Perroni, Guidetti, Cignitti and Baldari, 2014).

Table 3 Traumatic events

Fireman experiences:	Firefighter suffers:	Firefighter causes:
Death or serious injury to others as a direct witness to the event (especially to children, colleagues, or family members)	Severe threat to life or physical integrity	Death or serious injury to someone else
Especially tragic events, accidents involving many victims, disasters, Suicide witness	Serious road accident, burial under something irradiation, intoxication	Wrong decision, rescue mission failure, car accident

Source: author (Tomašková, 2012)

How to help the affected colleague or the victim of an accident?
There are applied the following rules (Marcinek, 2013):

- to talk: find the courage to address the victim,
- to support: the victim is taken from the exposed area, sitting down, leaning against the wall,
- to recall the reality: ask for name, calm breathing, recall inhale, exhale,
- to encourage: encourage the victim saying that his/her symptoms are normal in such a situation,
- to help: ask what he/she needs, offer a blanket, water, sensitively provide body contact,
- to move: no one can handle everything completely, if there is no strength to help the victim, you must let the colleagues, health professionals or other persons to do it.

How should superiors, affected persons, colleagues and life partners behave in a stressful extraordinary event? (Perroni, Guidetti, Cignitti and Baldari, 2014).

1. Firefighter's superior: should provide some protection to the affected fireman first. This includes a gentle approach immediately after the event. In a confidential interview, the superior can create a picture of his/her mental state, inform him/her of the upcoming possibilities of help and consult him/her on further steps.
2. Affected firefighter: the psychic situation of the affected firefighter is marked mainly by deep uncertainty and growing doubts or feelings of guilt. Many times, the firefighter had to act in a time of distress, in a highly dangerous situation.

He/she is thinking about how his relatives, his superiors, his colleagues will treat him/her now, and how they will deal with potentially controversial events. It is helpful from him/her if he/she talks to a person who understands him.

3. Firefighters: Action after a traumatic event may result in failure to address the surviving adverse event that may lead to remorse. It helps here if colleagues and professionals (psychologists) communicate with the affected firefighter and help him mitigate the consequences of a negative event.

Firefighter's partner in life: he/she is also shocked and confused. The partner in life should listen if he/she does not want to talk, should not force the firefighter, urge, or inquire. After some time, there may be a need to talk about everything, and then it is important to be an attentive and responsive listener (Pačaiová, Markulík, Turisová and Nagyová, 2018).

5 Evaluation of the workload of firefighters according to the characteristics of the subjective reaction of the employee to the load

The questionnaire method is used for subjective evaluation of the impact of work on the psyche of employees. It is suitable for screening evaluation of various work activities or professions. Based on ten items: time pressure, low job satisfaction, high responsibilities at work, numbing work, workplace problems and conflicts, monotony, nervousness, supersaturation, fatigue, long-term exceeding of maximum load capacity, and more. The method evaluates both the individual and group mental load at work in characteristics: psychological overload, monotonous load (monotony) and non-specific load. It also evaluates individual experience, subjective perceived mental load at work. The criteria for excessive psychological workload for the purposes of this Government Order include the third degree of psychological overload, the third degree of monotonous workload or the third degree of non-specific workload achieved in this method, see Table 4.

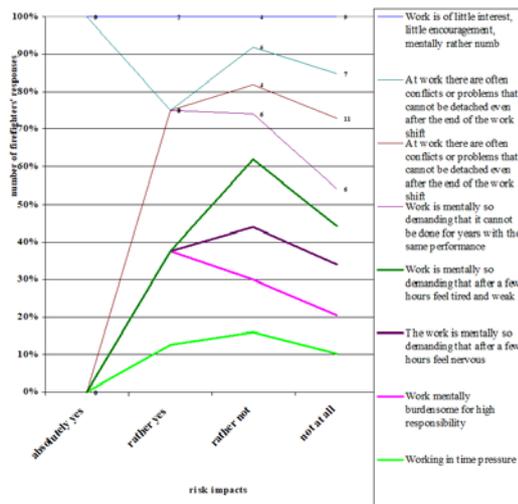
The method serves for subjective evaluation of the impact of work activity on the psyche of employees (OHS Framework Directive, 1989). It is suitable for screening evaluation of various work activities or professions. A sample of 15 firefighters of fire and rescue brigade (HAZZ) in Košice was evaluated.

Table 4 Questionnaire method form

Questions in the questionnaire	absolutely yes	rather yes	rather not	not at all
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Source: Perroni, Guidetti, Cignitti and Baldari (2014).

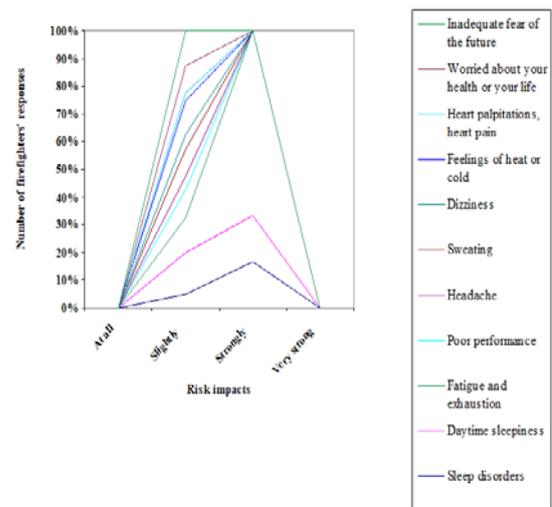
Figure 2 Evaluation of mental workload according to the characteristics of subjective response of employees to load



Source: authors' own graph based on a questionnaire

Graphical presentation of evaluation for mental workload according to the characteristics of subjective response of employees to load is visible on Figure 2. Firefighters have selected those items that have bothered them in the last three months and have indicated the intensity. In each item they

Figure 3 Questionnaire for evaluation of neurotic tendencies



Source: authors' own graph based on a questionnaire

circled one option, which most closely matched their opinion, Figure 3.

Table 5 Form for evaluation of mental workload

		at all	slightly	strongly	very strongly
1	Sleep disorders	0	1	2	3
2	Daytime sleepiness	0	1	2	3
3	Fatigue and exhaustion	0	1	2	3
4	Poor performance	0	1	2	3
5	Headache	0	1	2	3
6	Sweating	0	1	2	3
7	Dizziness	0	1	2	3
8	Fainting feelings	0	1	2	3
9	Vomiting and nausea	0	1	2	3
10	Feelings of heat and cold	0	1	2	3
11	Shaking, internal shaking	0	1	2	3
12	Restlessness and lack of concentration	0	1	2	3
13	Irritability and anger	0	1	2	3
14	Poor memory	0	1	2	3
15	Tingling and contraction pain	0	1	2	3
16	Heart palpitations, heart pain	0	1	2	3
17	Breathing difficulties	0	1	2	3
18	Lack of appetite	0	1	2	3
19	Diarrhoea or constipation	0	1	2	3
20	Flushing or fading	0	1	2	3
21	Pessimism	0	1	2	3
22	Pity or hypersensitivity	0	1	2	3
23	Sad or bad mood	0	1	2	3
24	I don't want to do anything	0	1	2	3
25	Indefinite anxiety or tension	0	1	2	3
26	Worried about health and your life	0	1	2	3
27	Unjustified fear tied to a certain situation	0	1	2	3
28	Inadequate fear of the future	0	1	2	3
29	Doubts about yourself	0	1	2	3
30	Feelings of insecurity in front of people	0	1	2	3
31	Feeling uncomfortable like in a dream	0	1	2	3
32	Intrusive thoughts or urge to act	0	1	2	3
33	Feeling stupefied	0	1	2	3

Source: own calculation of Tomašková and Balážiková (2012)

6 Assessment of the psychosocial risks of the firefighter profession

To illustrate the assessment of the psychosocial risks of the firefighter profession, an activity was selected - the intervention of a firefighter in a traffic accident, see Table 6. Firefighters carry out many activities in which they are at risk, but the most common interventions are different types of road accidents. A road accident is an event in road traffic in which people are killed or injured, or property is damaged in direct connection with motor vehicle traffic. Traffic accidents can be simple, mass or accident involving dangerous substances. The following table defines the threats to a firefighter in a road accident and a risk assessment. Risk analysis is the process of identifying hazards and assessing risk for individuals or groups of the population, objects, the environment and other objects under investigation. Risk analysis is usually a subjective process input indicator of which are not only quantitative ones, but also the possibility of compromise solutions, expert evaluations, etc. The risk analysis identifies the probability and scope of the consequences of a negative event resulting from a given work or other activity of the equipment or system. Based on hazard identification, it reveals the magnitude of the risk. A peculiarity of the risk analysis is that potential negative consequences are examined at

its beginning. The results of the analysis are of great importance for the adoption of justified and preventive solutions.

The risk assessment of the firefighter during the intervention was performed by the proposed risk matrix, see Table 1. The assessment of the risks of a firefighter in a traffic accident is in Table 6. The consequences of threat to health, human error and decrease of performance were taken into account in the risk assessment. In terms of the impact on human error, the highest risk is dangerous: the chaotic arrangement of the scene (inaccessible terrain). In terms of the impact on the health of the firefighter, the highest risk is in danger: the external environment. From the point of view of the consequence on the performance of the firefighter, the highest risk is in case of danger: chaotic arrangement of the place of intervention (inaccessible terrain) and the possibility of another accident.

Table 6 Specific assessment of psychosocial risks at work

Evaluation of mental workload											
Threat - Stressor	Consequence	Threat to health			Human error/injury			Decrease of performance			Measures
		P	D	R	P	D	R	P	D	R	
Road traffic density	Injury of a firefighter due to collision with other motor-car	II	A	Low risk	III	A	Medium risk	II	A	Low risk	Adherence to Tactical-methodical procedures of performing interventions, respecting the instructions of the commander of the intervention in traffic accidents, use of PPE.
Sharp objects at the scene of an accident	Cutting with the possibility of infection	III	A	Medium risk	III	A	Medium risk	II	A	Low risk	
Fragments of glass	Cutting	III	A	Medium risk	III	A	Medium risk	II	A	Low risk	
Occurrence of dangerous substances of different character	Health damage related to the properties of a dangerous substance	II	B	Medium risk	II	B	Medium risk	II	B	Medium risk	
Dangerous driving of drivers	Injury of a firefighter due to collision with the surrounding motor vehicle	II	A	Low risk	III	A	Medium risk	II	A	Low risk	
Chaotic arrangement of the place of intervention	Damage to health during the intervention in an unknown terrain	III	B	Medium risk	III	C	High risk	III	C	High risk	
Unavailability of getting to the place of intervention	Mental load from time stress	III	B	Medium risk	II	A	Low risk	II	A	Low risk	
Impossibility of battery disconnection	Possibility of fire or explosion	I	A	Low risk	I	A	Low risk	II	A	Low risk	
Complicated communication with injured persons	Damage to the fireman's health by an injured person who is in shock	III	A	Medium risk	II	B	Medium risk	I	A	Low risk	
Unpredictable behaviour of affected persons	Damage to the fireman's health by an injured person	III	A	Medium risk	II	C	High risk	I	B	Low risk	
Danger of threat by animals	Damage to firefighters' health by transported animal	I	B	Low risk	I	B	Low risk	I	B	Low risk	
Insufficient means to carry out rescue work	Mental load due to impossibility to help	II	A	Low risk	I	B	Low risk	II	A	Low risk	
Possibility of another accident	Mental load	II	B	Medium risk	II	B	Medium risk	II	C	High risk	
Dangerous substance with many dangerous properties	Damage to health	II	A	Low risk	I	A	Low risk	I	B	Low risk	
Adverse effect of weather conditions	Damage to health	III	A	Medium risk	II	B	Medium risk	I	B	Low risk	
Threat from the outer environment	Damage to health	III	B	High risk	II	B	Medium risk	II	A	Low risk	

Source: own calculation of Tomašková and Balážiková

7 Conclusion

As a result of the assessment of psychosocial risks in the profession of a firefighter, it was found out that their activity in performing the work task has an impact on human error or injury that may occur as a result of a stressful situation during work.

Also, working conditions significantly affect the performance of his/her activity, e.g. if the firefighter knows that there is a possibility of another accident, the risk of a decrease in performance is high. Activity in repressive intervention, which is characterized by a combination of high, often marginal, physical and mental load, necessarily requires adequate full competence. Each firefighter must be adapted so that he/she can cope with a specific physical and mental load in extreme conditions of intervention without risking his/her own health. Directly related to the effectiveness and success of the action, on which many people's health and lives depend, the possible failure of an individual means breaking the balance of the entire intervention group that leads into the success rate of liquidation of emergency but can result in a direct threat to other firefighters' life. (Vysocký, 2007). The results of the studies show that stress has an adverse effect on the ability of a person to work. The age category, which is most affected by the stress, is from 25-44 years. It is the most productive group of people, with 50-60 % of missed working hours related to stress. To solve the question of how to eliminate stress is important e.g. in terms of a greater satisfaction of people with their work. In severe traffic accidents, only seconds can decide on life or death, and whether a person will recover completely or have to live with a disability all his life. Rescuers must be able to act quickly. Heart rate, rectal temperature, blood pressure, changes in temperature and relative humidity inside the garment were measured on 18 professional firefighters wearing firefighting uniforms, protective clothing and breathing apparatus. Subjects trained on a cycling ergometer with a working load of 1.5 W. kg⁻¹, at 39 ° +/- 1 °C and at 70% +/- 5% of relative humidity. They stopped training at the point of subjective fatigue and overheating, which they judged would cause them to stop working during the actual extinguishing of the fire (Faff and Tutak, 1989). In order to ensure safety, health, comfort and long-term productivity it is necessary to regulate the requirements for tasks, so as not to burden or overburden the individual. Nevertheless, the risks of overload have been known for a long time, many professions are exposed to stress. Psychology has been trying to find it for a long time answers to questions and thus make a significant contribution to the study and assessment of mental workload (Wickens, 1992).

However, new technologies are being developed at high speed in the field of motor vehicle construction. Thanks to these technologies, the chance to survive an accident without serious injuries has improved significantly. However, this has also led to rescuers making their work in traffic accidents difficult.

Literature

1. OHS Framework Directive - Directive 89/391/EHS 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work. [online] <https://osha.europa.eu/sk/legislation/directives/the-osh-framework-directive/the-osh-framework-directive-introduction>
2. Vysocký, V.: *The issue of a differentiated way of leading a team in the areas of organizational and operational management within HAZZ*, Diploma Thesis, University of Ostrava, Faculty of Philosophy, Department of Psychology and Social Work 2007.
3. *Acute and post-traumatic stress responses after extreme service events*, Department of Psychology and Sociology, Praha, ISBN 80-86640-25-6.
4. Team of authors: *How to beat stress*, BELIMEX, Ltd., Bratislava, 2004, ISBN 80-89083-54-4.
5. Kožený, P. Hon, Z.: *Selected health risks in the work of firefighters*. [online]. <http://www.population-protection.eu/prilohy/casopis/41/355.pdf>
6. Praško, J., Prašková, H.: *Assertiveness against stress*, Grada Publishing, 1996, ISBN 80-7169-334-0

7. *Rapporteur - Fire protection and rescue service 2/2005*, pp. 23-25, ISSN 1335-9975
8. Decree of the Ministry of Health of the Slovak Republic No. 542/2007 on details of health protection against physical workload, mental workload and sensory workload [online] www.slov-lex.sk
9. Tomašková, M.: *Study of Psychological Strain of Firefighters* In: EICC 2012: Electronic International Interdisciplinary Conference: 3-7 September 2012: virtual peer-reviewed conference. - Žilina: EDIS, 2012 pp. 644-648. - ISBN 978-80-554-0551-3 - ISSN 1338-7871
10. Pačaiová, H., Markulík, Š., Turisová, R., Nagyová, A.: *How to Build Risk-based Thinking Methodology Based on Process* In: Acta Mechanica Slovaca, Journal published by Faculty of Mechanical Engineering, the Technical University in Košice. - Košice (Slovensko), Vol. 22, No. 1 (2018), pp. 24-32, ISSN 1335-2393
11. Marcinek, M.: *Testing the method of safe use of HVT when cutting the B-pillar in the event of an accident with a traffic accident on a selected car*, ACTA UNIVERSITATIS MATTHIAE BELII, Vol. XV., No. 2, 2013
12. Makara-Studzińska, M., Krystyna Golonka, K., Izydorczyk, B.: *Self-Efficacy as Moderator between Stress and Professional Burnout in Firefighters*, International Journal of Environmental Research and Public Health, 2019.
13. Perroni, F., Guidetti, L., Cignitti, L. and Baldari, C.: *Psychophysiological Responses of Firefighters to Emergencies*, Sports Sciences Journal, 2014.
14. Vysocký, V.: *The issue of a differentiated way of leading a team in the areas of organizational and operational management within HAZZ*, Diploma Thesis, University of Ostrava, Faculty of Philosophy, Department of Psychology and Social Work 2007.
15. *Acute and post-traumatic stress responses after extreme service events*, Department of Psychology and Sociology, Praha, ISBN 80-86640-25-6. 2007.
16. Team of authors: *How to beat stress*, BELIMEX, Ltd., Bratislava, 2004, ISBN 80-89083-54-4.
17. Matticks, C., Westwater, J., Himel, H., Morgan, R.: *Health risks to firefighters*, Journal Burn Care Rehabil, doi: 10.1097/00004630-199203000-00010.1992.
18. Macháč, M., Macháčová, H., Hoskovec, J.: *Emotions and performance*, SPN, 1988.
19. Praško, J., Prašková, H.: *Assertiveness against stress*, Grada Publishing, 1996, ISBN 80-7169-334-0.
20. *Rapporteur - Fire protection and rescue service 2/2005*, pp. 23-25, ISSN 1335-9975.
21. Decree of the Ministry of Health of the Slovak Republic No. 542/2007 on details of health protection against physical workload, mental workload and sensory workload. 2007.
22. Faff, J., Tutak, T.: *Physiological responses to working with firefighting equipment in the heat in relation to subjective fatigue*, Ergonomics, pp. 629-638, 1989.
23. Susana Rubio, S., Díaz, E., Martín, J., José M.: *Evaluation of Subjective Mental Workload*, Applied psychology: In: International Review, pp. 61-86, 2004.
24. Wickens, C.D.: *Engineering psychology and human performance*. New York: HarperCollins, 1992.

Primary Paper Section: A

Secondary Paper Section: AN, AQ

VISUAL VS. TEXTUAL PROGRAMMING: A CASE STUDY ON MOBILE APPLICATION PROGRAMMING BY TEENAGERS

^aTOMÁŠ TÓTH, ^bGABRIELA LOVÁSZOVÁ

^a*Department of Informatics, Faculty of Economics and Management, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia*

^b*Department of Informatics, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra, Tr. A. Hlinku 1, 949 01 Nitra, Slovakia*
email: ^attoth@uniag.sk, ^bglovaszova@ukf.sk

This study was written within the KEGA project 018UMB-4/2020 Implementation of New Trends in Computer Science to Teaching of Algorithmic Thinking and Programming in Informatics for Secondary Education.

Abstract: Choosing the right way of programming can prevent learning difficulties, contribute to increasing students' motivation to learn, and make teaching process more effective. The article is focused on assessing which way of programming, visual or textual, is appropriate for intermediate and advanced learners in the context of creating mobile applications. Three ways of programming were examined during an extracurricular programming course for teenagers aged 12-18 with previous programming experience and positive attitude to programming. The course was aimed at programming mobile applications. MIT App Inventor 2 as a visual programming tool and Android Studio with Java as a textual programming tool were chosen. Due to the gap between two programming tools, the method of transition from visual to textual programming using Java Bridge Code Generator and Java Bridge Library as mediators was implemented. The research results are based on the analysis of data obtained from participatory observations, interviews with students, questionnaires and source codes of applications created by students. The case study shows a difference in students' performance between visual and textual programming in favour of visual programming. However, the difference in students' attitudes toward visual and textual programming was the opposite in favour of textual programming, regardless of age and learning performance. These results suggest that App Inventor visual programming environment is advantageous at the beginning of learning programming, but may be perceived as too limited and not enough motivating for intermediate and advanced students, even though programming in Android Studio professional text-based environment is too challenging for them.

Keywords: mobile applications; teaching of programming; textual programming; visual programming.

1 Introduction

Teaching Informatics as school subject and specifically programming as a part of Informatics curriculum is important for students in several aspects. Computer skills are essential and beneficial for everyone in current digital age. However, teaching Informatics should not be focused only on acquiring skills to work with computers. Hromkovič and Steffen (2011) justify why teaching Informatics in schools is as important as other more traditional school subjects, thus it should also include fundamental concepts of computer science dealing with algorithmic information processing.

Teaching programming plays an important role in the development of computational thinking. This term was firstly introduced by Wing (2006): "Computational thinking involves solving problems, designing systems, and understanding human behaviour, by drawing on the concepts fundamental to computer science." It includes problem-solving skills such as abstraction, pattern recognition, decomposition, and algorithm design. Saeli et al. (2011) state that these skills are developed through programming, when students need to reflect how to communicate their solutions to the machine using a programming language. Several authors point to the benefits of learning programming to improve computational thinking and creativity through creating mobile apps (Dekhane et al., 2013; Tkáčová et al., 2017), designing games (Javidi and Sheybani, 2014), digital storytelling (Weintrop et al., 2018), controlling robots (Vega and Cañas, 2019). At the same time, difficulties with notation of algorithmic solutions need to be mentioned, which include problems of the syntax and the semantics of programming language that plays the role of a formal medium for expressing ideas.

Programming is considered by many authors as difficult and its learning is accompanied by various challenges. Many of them are associated with insufficient motivation of students, the

ability to solve problems, or the choice of programming way and programming environment, such as:

- complexity of the programming language and programming environment (Koorse et al., 2015; Krpan et al., 2017; Papadakis and Orfanakis, 2018; Radosevic et al., 2009; Saeli et al., 2011),
- difficulties with the basic programming concepts (e.g., control structures and loops) (Koorse et al., 2015; Krpan et al., 2017; Mladenović et al., 2018; Ouahbi et al., 2015; Papadakis and Orfanakis, 2018; Radosevic et al., 2009),
- syntax and semantics issues (Koorse et al., 2015; Krpan et al., 2017; Mladenović et al., 2018; do Nascimento et al., 2019; Ouahbi et al., 2015; Radosevic et al., 2009; Saeli et al., 2011),
- insufficient planning and designing of the algorithm (Koorse et al., 2015; Krpan et al., 2017; Papadakis and Orfanakis, 2018).

Thus, the choice of an appropriate programming language and programming environment can affect students' success in their learning to program. Krpan et al. (2017) state that especially the student's first contact with programming is often a key moment when the student gains or loses interest in programming. For this reason, it is important to choose a suitable programming language and programming environment.

Garneli et al. (2015) also point out that many parameters must be considered in the teaching of programming, such as the age of the students, their experience, and the learning objectives. The right choice of programming way, programming language and programming environment can lead to the prevention of difficulties associated with learning programming and increase students' motivation to learn programming. Therefore, teaching environments developed especially for educational purposes are often used in education instead of professional programming environments and languages that are too complex for beginners.

Many educational programming environments use visual block-based program notation, which is considered more suitable for novice programmers than textual programming. João et al. (2019) present a cross-analysis of the core characteristics of 26 block-based and visual programming environments used in teaching computational thinking and programming. The overview presents wide range of visual programming environments suitable for age categories from preschoolers to high school students.

However, Deng et al. (2020) remind the fact that block-based programming is less authentic and less functional than text-based programming, and therefore, block-based programming alone might not be enough for students to understand the real meaning of programming and may have a negative impact on their future studies in computer science. Noone et al. (2021), at the same time, point out that there exists a gap in the education of students in their mid-to-late teenage years, when perhaps visual programming languages are no longer suitable, but textual programming languages may involve excessive learning effort.

While visual programming is considered to be more advantageous choice for novice programmers (Attard and Bussttil, 2020; Deng et al., 2020; Weintrop and Wilensky, 2017), various studies address the process of transition from visual to textual programming for intermediate and advanced students (Cheung et al., 2009; Krpan et al., 2017; Noone et al., 2021; Vega and Cañas, 2019; Weintrop and Wilensky, 2019).

This article explores one implementation of a transition from visual to textual programming in the context of mobile application development, which uses hybrid environment for bridging the gap between visual and textual programming, and answers the following research questions (RQs):

RQ1: How does performance of intermediate teenage programmers in the field of creating mobile applications differ according to the way of programming (visual, hybrid, textual)?

RQ2: How do teenagers' attitudes toward learning programming in visual and textual way differ according to age and programming skills?

In our implementation, MIT App Inventor visual programming environment, Java Bridge Code Generator hybrid environment, and Android Studio with Java Bridge Library textual programming environment are used during informal programming course for teenage students with previous programming experience.

2 Ways of Code Creating

2.1 Visual Programming

In visual programming, the programming is performed using a visual programming language and a visual programming environment. The visual programming language is made up of pre-prepared graphic elements. Each graphic element represents a certain part of the programming language – individual commands, programming concepts (e.g., command to create a variable, loop, condition). The graphic elements also use a higher degree of abstraction, thanks to which even more complex functions can be encapsulated in one graphic block. Therefore, the programmer does not need to know how the function is implemented in order to be able to work with it (Paternò and Santoro, 2019).

Programming is done by combining pre-prepared graphic elements. Graphic elements (also called blocks) are usually connected in a drag & drop way – the programmer takes a specific block from the palette (block menu) and moves it to the canvas (desktop). So, it is not necessary for the programmer to memorize commands (Krpan et al., 2017; do Nascimento et al., 2019; Weintrop, 2015). When connecting graphic blocks, it is defined which blocks can be and which cannot be connected to each other. This is usually ensured in programming environments by using the principle of jigsaw puzzle, where the graphic blocks have a shape like parts of a puzzle (Hsu, Ching, 2013; Musmarra, 2018; Paternò and Santoro, 2019). It makes joining blocks more intuitive (Weintrop and Wilensky, 2019).

If two blocks cannot be joined into the syntactically correct form of the expression, the programming environment prevents them from being joined. It is a prevention of syntactic errors (Hsu,

Ching, 2013; Koorsse et al., 2015; Weintrop and Wilensky, 2018). The shape of graphic block is also a hint of how many connections with other blocks can be made in terms of inputs as well as outputs of the given block (Paternò and Santoro, 2019). Weintrop (2015) states that although visual programming environments prevent the creation of syntax errors, overall, they do not solve this problem, but only delay it to later periods of programming in other textual programming languages.

Visual programming and visual programming environments are currently popular especially in teaching the programming fundamentals. Their use is successful in involving students in programming activities and providing a sense of success in the early stages of learning to program. Such languages are mainly used for the development of algorithmic thinking. Examples of visual programming languages and environments are Scratch, MIT App Inventor 2 and Alice. An overview of pros and cons of visual programming is presented in Table 1.

2.2 Textual Programming

In textual programming, the programming is performed by writing text and with using textual programming environments. A textual programming language is a programming language which consists of a set of instructions that are in the textual form. All textual programming languages have their own syntax rules. In the case of this type of programming languages, the creation of semantically and syntactically correct code is not ensured by such mechanisms as in the case of visual programming languages. This fact increases the complexity of programming. Unfortunately, some errors in the text code may be reflected in the incorrect functionality of the program, or the program may not even be compiled and run, unlike visual programming, where the wrong code essentially cannot be created. Such situations require extra effort and time to properly identify the error in the program and resolve it. Therefore, textual programming languages can be challenging for the students. For novice programmers the complexity of textual programming and the number of commands is often limiting in creating algorithms. However, the disadvantage of more demanding program creation can be overcome by students' feeling that they are working with a professional tool. Students can gain an authentic programming experience. Such programming opportunity may be interesting for students with greater expectations and needs (Garneli et al., 2015; Mladenović et al., 2018). Examples of textual programming languages are Python, Java, and C#. An overview of pros and cons of textual programming is presented in Table 2.

Table 1 Pros and cons of visual programming

Pros	Cons
<ul style="list-style-type: none"> ▪ Easy to start creating functional programs ▪ A large amount of knowledge is not required (general about programming, to memorize commands) ▪ Intuitiveness of program creating by joining blocks (prevention of syntax errors as well) ▪ The graphic nature increases the intelligibility of the elements ▪ Immediate feedback ▪ Simplified error detection ▪ Attractiveness for students (it consists in the interactivity of programming environments, in the use of multimedia elements and in the thematic focus) 	<ul style="list-style-type: none"> ▪ Deteriorating readability / comprehensibility of the program with increasing program complexity ▪ Limited options of program creating (some features or options may not be available)

Table 2 Pros and cons of textual programming

Pros	Cons
<ul style="list-style-type: none"> ▪ More suitable for creating more complex programs ▪ The readability of the program can be maintained even with its increasing complexity ▪ More options for creating a program (the programmer is not as limited as in the case of a visual programming language) 	<ul style="list-style-type: none"> ▪ More difficult to understand for beginners ▪ Requires more knowledge (general about programming, know commands, syntax)

2.3 Hybrid Programming

The meaning of the term hybrid programming in the context of this article cannot be confused with the meaning of this term in context of cross-platform mobile app development (the application is developed for several operating systems at the same time) nor with the term in context of multi-paradigm programming languages (programming languages based on more than one programming paradigm). In the connection with visual and textual programming, hybrid programming is a such way of programming where the students use both elements of visual programming and textual programming. The student can create program by joining graphic blocks, while the visual code can be translated into an equivalent textual form and the textual code can be modified and expanded by writing text – program instructions in textual form.

It is usually used in the student's transition from visual to textual programming as an intermediate step between these two ways of programming. Students can better create mental connections between these two contexts (visual and textual programming) by using both ways of programming at the same time and working with visual and textual representation of the same program. The aim is to make this transition easier for students, to make it smoother and to prevent various difficulties, which are associated with the transition (Tóth and Lovászová, 2018). An overview of pros and cons of hybrid programming is presented in Table 3.

Table 3 Pros and cons of hybrid programming

Pros	Cons
<ul style="list-style-type: none"> ▪ Possibility to work with visual and textual programming ▪ Helping to create mental connections between visual and textual programming ▪ Simplifying the student's transition from visual to textual programming 	<ul style="list-style-type: none"> ▪ Requires knowledge of visual as well as textual programming ▪ Greater complexity of program creation due to the use of two ways of programming

Examples of hybrid programming languages, environments, or tools which support hybrid programming are:

- Java Bridge – uses visual programming of mobile applications on the principle of MIT App Inventor 2 and textual programming in the Java programming language (App Inventor (a), n.d.),
- PencilCode – allows to create and edit code in a textual way and at the same time with graphic blocks (Alrubaye, 2019)
- Pencil.cc – an environment that allows the creation of isomorphic code by visual and textual programming (Weintrop and Wilensky, 2017),
- PyBlockly – the environment based on the principle of turtle graphic; it uses visual programming language and textual programming language Python (Strong et al., 2018),
- BrickLayer – allows to visually create programs for Arduino microcontrollers platform and the code is translated into the textual programming language C (Cheung, 2009).

3 Materials and Methods

3.1 Implementation Process

Based on the defined research questions, we carried out research in the field of teaching mobile application programming in secondary education. For this purpose, a leisure course of mobile application programming was organised. Applications were created for operating system Android. The research was conducted during the school year 2018/2019. The course took place once a week and comprised two school lessons (total of 90 minutes). The course was led by one lecturer, who was also in the role of researcher. All conceptual and teaching issues were consulted with expert researcher.

The intention of the course was also to allow students to program in all three ways of programming. The aim was to verify the suitability of the implementation of these programming ways in secondary education and their impact on the effectiveness of education. The course schedule was divided into three stages:

1. Visual programming stage

- students use visual programming in visual programming environment,
- education is focused on basic programming concepts,
- getting to know the programming environment and gaining the first experience in creating mobile applications by visual programming.

2. Hybrid programming stage

- first, students use visual programming in visual programming environment,
- subsequently, students generate equivalent text code from the code in the form of graphic blocks,
- the generated text code is transferred to the textual programming environment,
- education is focused on getting to know the text equivalent of an already known program previously created by visual programming, getting to know the new used tools, textual programming environment and textual programming language,
- students experiment with minor modifications of the code by textual programming (e.g., changing the arguments of commands), analogically extend the code by textual programming according to the already generated textual code,
- gaining the first experience with development in a textual programming environment.

3. Textual programming stage

- students use textual programming in textual programming environment,
- pointing to the analogy with programming in visual programming environment; techniques of mediated knowledge transfer from one context to another one are used too (Perkins and Salomon, 1988; Perkins and Salomon, 1992).

The order of the stages was deliberately chosen. Visual programming is easier to get started, so it was included in the first stage. The direct transition from visual to textual programming can be accompanied by various challenges, so the stage of hybrid programming has been inserted between visual and textual programming stage as an intermediate step. The design of the transition strategy from one way of programming to another one is dealt in more detail in (Tóth and Michaličková, 2018). In each stage, students worked on three projects (Table 4). The difficulty of projects increased during the stage.

Table 4 The course schedule

Stage	1. Visual programming			2. Hybrid programming			3. Textual programming		
Project	Hello World (V1)	Catch the Egg (V2)	Project (V3)	Hello World (H1)	ChatBot (H2)	MoleMash (H3)	Hello, Purr (T1)	Roll the Dice (T2)	Project (T3)
Duration (number of lessons)	1	3	5	3	3	3	1	2	5
Complexity	Simple	Simple/Complex	Complex	Simple	Simple/Complex	Complex	Simple	Simple	Complex

In addition to the personal assistance of the lecturer, the students had available short handouts as another assistance tool. The handouts contain application instructions, such as application functionality requirements, a preview of the application graphical user interface (GUI), an outline of the solution in form of subtasks and others. The purpose of using short handouts as learning material was also to support students in active independent work on projects. At the same time, it allowed differentiation according to students' abilities.

Students could demonstrate independence at work especially by solving individual projects. The creation of individual projects was included at the end of the stage of visual and textual programming. The topic of the individual project was chosen by the students in both stages. By creating the individual project, students had to prove what they learned in the previous period and what application they are able to create independently. Unlike the previous created applications, during the lessons on which the students worked on their own individual projects, they did not have a formal description of the final product and sketch of the solution. The assignments of individual projects were formulated in such way to provide maximum space for students for their own creativity and creation. During the application creation they had to analyse the problem, design the structure of the application and design how to implement its functionalities.

3.2 Participants

The research is carried out with a small group of participants, in which examined elements are recorded in detail and analysed. The research sample consists of 14 secondary school students. 13 students were male and one female. Students' age range were from 12 to 18 years.

In order to determine students' attitude to programming, the range of programming experience, and knowledge of basic programming concepts, an entry questionnaire was prepared. The students' answers show that:

- Students have a positive attitude towards Informatics and programming. They attended our programming course in their leisure time. Their increased interest in programming is also evidenced by the fact that 86% of students stated that they enjoy programming very much and the remaining 14% stated that they enjoy programming a bit. 57% of students stated that they would like to devote to programming at a professional level in the future.
- All students already had programming experience. Half of the students program one or two years. Students already had experience mostly with educational programming environments and languages such as Imagine Logo, Scratch, Python and Baltík. Four students also had experience with MIT App Inventor 2, two students had experience with the Java programming language and one student had experience with Android Studio. No student in the research sample had experience with Java Bridge. Some students also had experience with programming tangible construction kits and robotics (e.g., Lego Mindstorms, Micro:bit, Sphero, Ozobot) and four students also had some experience with programming mobile devices.
- Students are familiar with several terms in the field of algorithmic structures (loop, conditions, procedure, library), work with data (variable, parameter, constant, data type), object-oriented and event-driven programming (class, object, event, component). The level of conceptual understanding was not ascertained.

3.3 Instruments

The focus on programming mobile applications also influenced the choice of programming environment for the stages. For each of the three stages, we chose environment which allows mobile application programming and at the same time it allows programming in the way specified for the stage. The selected tools can be divided according to the stage in which they were used:

1st stage: MIT App Inventor 2 (MIT AI 2)

- visual programming environment for creating applications for mobile devices with operating system Android,
- hides the complexity of development and allows the student to focus on the design GUI of application, its functions and how the user will work with it.

2nd stage: Java Bridge (Java Bridge Code Generator) and Android Studio

- under the term Java Bridge is distinguished Java Bridge Code Generator and Java Bridge Library,
- Java Bridge Code Generator is an exploratory version of the programming environment MIT AI 2 that allows students to create an application just like in programming environment MIT AI 2 (by visual programming) and then generate an equivalent textual version of the application code in the programming language Java (App Inventor (b), n.d.),
- Android Studio is used to view and edit the generated code.

3rd stage: Android Studio, Java and Java Bridge (Java Bridge Library)

- Android Studio is a professional textual programming environment for creating mobile applications for the operating system Android,
- Java is a programming language for programming mobile applications for the operating system Android,
- Java Bridge Library is a library of programming language Java,
- Java Bridge Library uses the same terminology as is used in MIT AI 2 – there is a Java class for each component – the class encapsulates the complexity of functionality just like in MIT AI 2,
- Java Bridge Library in this way facilitates textual programming of mobile applications for operating system Android than it is with standard way using Android SDK (App Inventor (b), n.d.).

3.4 Data Collection and Data Processing

Several research methods were used for data collection: questionnaires, problem-solving interviews, informal interviews with students, focus groups, participatory observation, unstructured observation, field notes and product collection (student-created applications).

Using these data collection methods, we obtained data which were processed by qualitative and quantitative methods. Therefore, some qualitative data were quantified (converted to numerical form). We obtained data of three types:

1. data obtained from observations and interviews

- converted into text in the form of protocols,
- texts were analysed and processed by categorization and coding,

2. data obtained in textual form from questionnaires

- entry questionnaire implemented using online Google Forms about students' attitudes, motivations, and their aptitude for programming
- questionnaires during lessons implemented using Socrative audience response software with instant feedback after each question used to:
 - verify student's knowledge and understanding of the crucial concepts,
 - get continuous feedback on students' attitude to the content and the form of lessons
- final questionnaire implemented using online Google Forms containing questions on self-assessment and on attitudes to the programming tools and approaches used.

3. data obtained in the form of collected products – applications' source codes created by students

- to verify the student's mastery of the problem and to identify problematic parts of its solution,
- the source codes were uploaded to the cloud storage Google Disk by the students for making them available to the lecturer,
- the source codes were analysed, and the obtained data were quantified into:
 - *difficulty score* – the sum of *programming difficulty* (the number of essential activities related to designing and coding) and *technical difficulty* (the number of essential activities related to the project development in the programming environment and to building the application),
 - *solution success rate* – the extent of learning objectives defined for the project achieved by student,
 - *weighted performance* – students' performance in solving projects; evaluated on the basis of difficulty score and solution success rate.

Collected data was coded by two researchers and analysed through discussion.

4 Results

The achieved results are divided into results obtained from subjective data (from observations and expressions of students) and into results obtained from objective data (from the analysis of submitted products).

4.1 Results from the Evaluation of Subjective Data

Results from subjective data are evaluated according to the defined stages.

4.1.1 Stage of Visual Programming

The visual programming environment MIT AI 2 did not cause problems for the students. The students advanced quickly. They were able to solve tasks independently. Thanks to the handouts, students were able to work at their own pace. They were able to perform at the level of Creativity of the Revised Bloom's Taxonomy already during the creation of the applications which were created by students together with the lecturer. The students' activity increased even more in solving individual projects. They worked creatively and, in addition, improved the applications with various personal ideas. Errors in the program occurred only occasionally, mainly related to the application logic.

The mobile applications development in MIT AI 2 was enjoyed by students. The students presented their experience with MIT

AI 2 as positive, what is also confirmed by the students' verbal statements:

Student12: „I like that it was quite easy to program there (in MIT AI 2).“

Student14: „I liked the ease with which applications could be created.“

Student4: „I liked it, I'm glad I learned how to program applications in App Inventor.“

Students' interest in programming using MIT AI 2 is also confirmed by other students' statements. A total of 85.7% of students stated in the final questionnaire that they programmed applications in MIT AI 2 on their own initiative at home as well.

Most students feel confident developing mobile applications in MIT AI 2. A total of 75% of students answered that they can create applications in MIT AI 2 and no student stated that they cannot create applications (Table 5). The connections of the answers with the students' age were not recorded in this case.

While working with MIT AI 2, the students gradually encountered several limitations in programming the application functionality or creating GUI, such as the inability to dynamically create GUI components, or limited options for setting up components. In addition, students began to express feelings and opinions that MIT AI 2 is already easy for them:

Student9: „App Inventor is so childish.“

The students were interested in moving even further forward in programming, including by moving to another programming environment:

Student1: „It was a nice introduction to mobile application programming, but it's time to move on.“

4.1.2 Stage of Hybrid Programming

Thanks to the handout, students were able to work independently at this stage too. Some students solved all the tasks and programmed the application according to the instructions from the handout even without the lecturer help. A few students even expanded the application with more similar features.

The students also did well with programming in Android Studio, even though they did not know the meaning of each line of Java code. They were able to solve tasks logically and analogously according to the already existing code and their previous experience and knowledge. We also noticed a positive attitude from the student's statement:

„It looks complicated, but it's quite easy to understand.“

The youngest students aged 12 and 13 progressed the slowest. The greatest progress was made by Student7 (16 years old). This student was so successful in textual programming that he did not even use the Java Bridge Code Generator and he did not program in hybrid way. He programmed using just textual programming and Java Bridge Library. Later, several other students gradually joined this student. Student7 explained his action by saying that creating an application using textual programming does not cause him a problem. On the contrary, the combined work with visual and textual programming environment is delaying.

Syntactic errors did not occur much at this stage. Only the youngest student had the biggest problems with syntactic rules. The most common problems were technical:

- Problems related to project as an application structure – students had difficulty understanding the nature of using the project as a whole covering different parts of the application (e.g., problem to distinguish where to insert images within

the folder structure of the project, problem to distinguish between the meaning of the project and the Java file).

Table 5 Students' subjective evaluation of the degree of mastery of mobile applications creating in MIT AI 2

Degree of mastering the creation of mobile apps in MIT AI 2	Likert scale (LS)	Number of students by age							Total	Average age
		12	13	14	15	16	17	18		
I handle it very well	2	0	0	1	1	0	0	0	2 (25%)	14.5
I can handle it	1	1	0	1	0	1	1	0	4 (50%)	14.8
Undecided	0	0	1	0	0	0	0	1	2 (25%)	15.5
I cannot handle it	-1	0	0	0	0	0	0	0	0 (0%)	N/A
I cannot handle it at all	-2	0	0	0	0	0	0	0	0 (0%)	N/A
Average answer (LS)		1.0								-

- Problems related to Java code structure – to which specific place in the Java code student should write the new code (it is necessary to be aware of the code structure, ranges of code parts (enclosed in curly brackets {}), but also which parts of the code refer to each other (which methods are called and from which part of code are called)). These problems occurred mainly in the case of the three youngest students.

The students began to feel frustration and demotivation due to higher incidence of errors and the need to resolve them. Debugging errors of various kinds required much more time and more attention of students at this stage. The development of the application was no longer so smooth and linear. The help of a lecturer was more necessary.

Despite these difficulties students expressed a positive attitude towards the Java Bridge Code Generator in their final assessment (Table 6). The connection of the answers with the students' age was not recorded in this case.

The students positively commented Java Bridge Code Generator, but they also were able to critically evaluate it:

„I liked that the Java code could be generated.“

„I could help myself if I couldn't program something in Java.“

„Easy transfer of the code to other programming environments, but I lack the ability to run it quickly (build, run and test application).“

„I didn't like that the code generation feature wasn't working as it should and you still need to modify the application code to work.“

When asked whether the code generation was helpful for students together more than half of the students (57.2%) gave a positive answer (Table 7).

4.1.3 Stage of Textual Programming

Already during the transition to textual programming of mobile applications, students had positive expectations. Students again became more successful in application development. In contrast to the end of the second stage, where there were feelings of frustration and demotivation, in the third stage, the students began to make a positive impression again. All students managed the first application without major problems. Essentially, the students were able to work independently according to the handout. However, there were bigger differences in their pace of work. Some students also worked at home in their own initiative according to handout (stated by 50% of students in questionnaire).

If necessary, students also helped themselves using Java Bridge Code Generator and hybrid programming at this stage, especially when solving individual projects (T3) – stated by total of 42.9% of students in final questionnaire (Table 8).

They used Java Bridge Code Generator mainly in case of:

- GUI creation – for more convenient GUI creation visually using virtual screen than textually using the Java Bridge Library in Android Studio,
- if they forgot how to write the command – e.g., what the command syntax for defining the event listener looks like.

Table 6 Students' evaluation of their attitude to Java Bridge Code Generator

Students' attitude to Java Bridge Code Generator	Likert scale (LS)	Number of students by age							Total	Average age
		12	13	14	15	16	17	18		
Great tool	2	0	2	0	2	0	1	1	6 (43%)	15.2
Good	1	0	0	0	1	1	1	0	3 (21%)	16.0
Undecided	0	1	0	0	0	0	0	1	2 (15%)	15.0
Poor	-1	0	0	2	0	1	0	0	3 (21%)	14.7
Very bad tool	-2	0	0	0	0	0	0	0	0 (0%)	N/A
Average answer (LS)		0.9								-

Table 7 Students' evaluation of rate of help provided by code generation

Rate of help provided by code generation	Likert scale (LS)	Number of students by age							Total	Average age
		12	13	14	15	16	17	18		
Definitely helpful	2	0	1	0	1	1	2	1	6 (42.9%)	16.0
Rather helpful	1	0	1	1	0	0	0	0	2 (14.3%)	13.5
Neither yes nor no	0	0	0	0	2	0	0	0	2 (14.3%)	15.0
Rather not helpful	-1	1	0	0	0	1	0	1	3 (21.4%)	15.3
Not helpful at all (it is not needed)	-2	0	0	1	0	0	0	0	1 (7.1%)	14.0
Average answer (LS)		0.6								-

Table 8 Students' evaluation of the frequency of helping with the code generation during textual programming of individual project (T3)

The frequency of helping with the code generation during programming of individual project (T3)	Likert scale (LS)	Number of students by age							Total	Average age
		12	13	14	15	16	17	18		
Often	2	0	0	0	0	1	1	0	2 (14.3%)	16.5
Occasionally	1	0	0	1	1	0	1	1	4 (28.6%)	16.0
Undecided	0	0	0	0	0	0	0	0	0 (0%)	N/A
Rarely	-1	1	1	0	0	0	0	0	2 (14.3%)	12.5
Never	-2	0	1	1	1	0	0	0	3 (21.4%)	14.0
I did not program T3	-	0	0	0	1	1	0	1	3 (21.4%)	16.3
Average answer (LS)					0					-

A greater connection with the students' age was recorded in this case – especially younger students said they did not help themselves by generating code – some were discouraged by the complexity of using two programming environments, for others such work was delaying.

The students faced several challenges when programming mobile applications in textual way compared to visual programming:

- Work also at the level of the file and folder structure of the project – it was no longer enough to work only at the level of creating the code (e.g., creating a screen consists not only of creating the screen as a logical element in the code, but also as a file).
- Work with multiple files at once – when implementing some functions of the application, it is necessary to intervene in the code of several project files (e.g., add vibration command in .java file and add vibration permission in AndroidManifest.xml).
- Work with files in multiple formats – students worked with .java, .xml files and with media of various formats during the development.
- GUI creation in textual way – GUI is not created with Java Bridge Library in visual way by moving components to the virtual screen of the device using drag & drop method; GUI is created by writing textual code within a .java file.
- Syntax of the programming language – students must know and consciously follow the syntactic rules of the programming language.
- Writing code directly – there is no such pallet of components and blocks as in MIT AI 2, from which students would just choose and compose a program.
- Creating responses to the events – multi-step implementation requiring code to be written to multiple locations within the code structure of the .java file.
- Working with data types – when creating variables and objects, it is necessary to define their data type.

The errors that most often occurred to students during programming at this stage can be categorized as follows:

- problem with application building due to the use of different physical devices for testing by students (need for proper configuration of the build),
- omission of some part of the implementation of the event response or incorrect definition,
- adding a command to the wrong place within the structure of the .java file, or due to the semantic meaning of the commands (e.g., adding a command to open a new window to the part of another method where the method parameters should be written) or with respect to the chronological execution of the code (e.g., first the action was performed

according to the generated number and only then the number was generated, or the use of a component that was only declared and not initialized),

- syntactical errors (e.g., missing semicolon, brackets, etc.) – already higher incidence than in the previous stage.

Despite several complications and a higher incidence of errors during the third stage of textual programming, in the end, the students were not dominated by negative feelings or attitudes to textual programming in Android Studio. Their feeling and attitudes were exactly the opposite. For example, although working with a project at the level of its folder structure appeared to be problematic for students during the application creation, only one student confirmed this in final questionnaire. A total of 64.3% of all students said that working with the project is not difficult. Most students do not even find textual programming in Android Studio difficult at all (Table 9).

Similarly, the students expressed a positive self-assessment of their ability to create applications by textual programming in Android Studio using Java Bridge Library. 35.7% of students stated that they can create an application in Android Studio completely independently. The students most often stated that they can create the application with the help of more experienced person (e.g., a teacher) (57.1% of all students stated this), with the help of internet (50%), with the help of the handout (42.9%) and with the help of code generation (42.9%). None of the students stated that he/she is not able to create application in Android Studio.

Similarly, the students expressed a positive self-assessment of their ability to create applications by textual programming in Android Studio using Java Bridge Library. 35.7% of students stated that they can create an application in Android Studio completely independently. The students most often stated that they can create the application with the help of more experienced person (e.g., a teacher) (57.1% of all students stated this), with the help of internet (50%), with the help of the handout (42.9%) and with the help of code generation (42.9%). None of the students stated that he/she is not able to create application in Android Studio.

In addition, half of the students stated that textual programming suited them best and on the contrary, no student stated that the visual programming suited him/her best (Table 10). The distribution of the answers is not related to age.

Due to this subjective perception of students, students stated that they would welcome even more opportunities to deal with textual programming in programming language Java and even without using the Java Bridge Library.

Table 9 Students' difficulty evaluation of textual programming in Android Studio

Difficulty of textual programming in Android Studio	Likert scale (LS)	Number of students by age							Total	Average age
		12	13	14	15	16	17	18		
Very easy	2	0	0	1	0	1	0	0	2 (17%)	15.0
Rather easy	1	0	0	1	1	0	0	0	2 (17%)	14.5

Neither easy nor hard	0	0	2	0	1	1	2	1	7 (58%)	15.6
Rather hard	-1	1	0	0	0	0	0	0	1 (8%)	12.0
Very hard	-2	0	0	0	0	0	0	0	0 (0%)	N/A
Average answer (LS)					0.4					-

Table 10 Students' evaluation of their affection for a specific way of programming

Students' affection for a specific way of programming	Number of students by age							Total	Average age
	12	13	14	15	16	17	18		
Textual	1	1	2	1	1	1	0	7 (50%)	14.4
Hybrid	0	1	0	1	0	1	1	4 (28.6%)	15.8
Visual	0	0	0	0	0	0	0	0 (0%)	N/A
Undecided	0	0	0	1	1	0	1	3 (21.4%)	16.3

4.2 Results from the Evaluation of Objective Data

Based on a detailed analysis of data in the form of submitted products (programming projects created by students), we have achieved the results of objective evaluation of students. In terms of the difficulty score, the following facts can be observed (Table 11):

- the projects in the 2nd stage had the highest average score of the total difficulty and to lowest in the 3rd stage,
- the projects in the 2nd stage had the highest technical difficulty score and the lowest in the 1st stage,
- the projects in the 1st stage had the highest programming difficulty score and the lowest in the 3rd stage.

In terms of the average weighted performance of students (Figure 1), it can be stated:

- students on average reached the highest value of the average weighted performance in the 1st stage and the value decreased with each subsequent stage (0.83 0.72 → 0.62),
- at the beginning of each stage, it is possible to observe an increase in weighted performance; the most significant increase was at the beginning of the 1st stage; the increase at the beginning of the stage decreases with each subsequent stage,
- the average weighted performance in the individual project in the 1st stage (V3) is greater than in the case of the individual project in the 3rd stage (T3).

Taking a more detailed look at the distribution of students' weighted performance in creating individual projects in the first (Table 12) and the third stage (Table 13) according to age, we can observe that there are no significant age differences in student performance when programming in App Inventor. In contrast, when programming in Android Studio, the weakest performance is reached by the three youngest students.

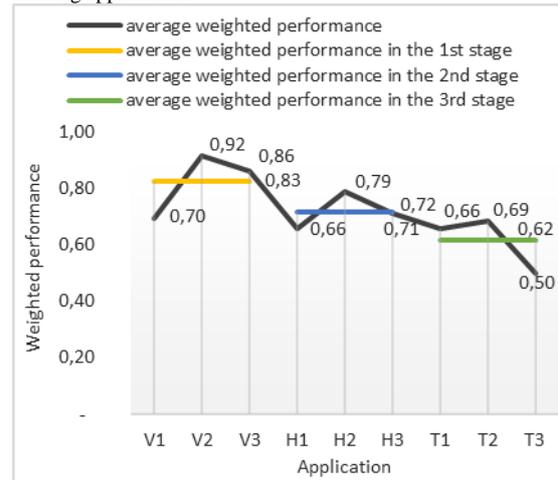
Table 11 Difficulty score of projects in the visual, hybrid, and textual stage

Project identifier	1st stage (visual)			2nd stage (hybrid)			3rd stage (textual)		
	V1	V2	V3	H1	H2	H3	T1	T2	T3
Programming difficulty	8	17	17.2	9	10	15	7	10	10.9
Technical difficulty	7	5	4.8	10	11	13	8	8	7.1
Total difficulty	15	22	22	19	21	28	15	18	18
Average difficulty		19.67			22.67			17.00	

Table 12 Weighted performance of students in individual projects V3

Weighted performance in V3	Number of students by age							Total	Average age
	12	13	14	15	16	17	18		
1.50 – 1.21	0	0	1	0	0	0	0	1 (7%)	14.0
1.20 – 0.91	1	0	0	0	0	1	0	2 (14%)	14.5
0.90 – 0.61	0	0	1	2	1	1	1	6 (43%)	15.8
0.60 – 0.31	0	2	0	0	0	0	1	3 (22%)	14.7
0.30 – 0.00	0	0	0	0	0	0	0	0 (0%)	N/A
no rating (not submitted)	0	0	0	1	1	0	0	2 (14%)	15.5

Graph 1 Average weighted performance of students during creating applications



5 Discussion

Based on the obtained results, we formulate answers to the research questions.

RQ1: How does performance of intermediate teenage programmers in the field of creating mobile applications differ according to the way of programming (visual, hybrid, textual)?

Results showed that students achieved the highest average weighted performance in the visual programming stage. At this stage, students also made the most significant progress (the most significant increase of average weighted performance) of all three stages (Figure 1). These factors have a positive effect on students' sense of success in mobile application programming.

Table 13 Weighted performance of students in individual projects T3

Weighted performance in T3	Number of students by age							Total	Average age
	12	13	14	15	16	17	18		
1.50 – 1.21	0	0	0	1	0	0	0	1 (7%)	15.0
1.20 – 0.91	0	0	1	0	0	0	0	1 (7%)	14.0
0.90 – 0.61	0	0	0	0	1	0	1	2 (14%)	17.0
0.60 – 0.31	0	0	0	0	0	1	0	1 (7%)	17.0
0.30 – 0.00	1	1	1	0	0	0	0	3 (22%)	13.0
no rating (not submitted)	0	1	0	2	1	1	1	6 (43%)	15.6

Students had a high level of self-confidence in visual programming – no student stated that he/she cannot create applications in MIT AI 2. The created applications in this stage had the lowest technical difficulty score and, conversely, the highest programming difficulty score (Table 11), which indicates a low workload of students with technical aspects of the development and high degree of programming skills to work in this way. Students were able to focus mainly on programming itself and not on the technical aspect of development. These results are consistent with the statements of other researchers that are presented in the chapter Ways of Code Creating. Visual programming enabled students to make great use of their own creativity in creation. Looking at the results of creating individual projects, which reflect the level of students' ability to independently create an application in a specific way of programming, we can see that students also achieved the highest degree of independence in visual programming – the average weighted performance in projects V3 is higher than in T3 (Figure 1).

During hybrid programming, there were greater differences between students in their ability to move forward and create applications in this way. Students' performance was also negatively affected by the fact that the applications created at this stage had the highest difficulty score. Especially the difficulty of technical aspect of the solution increased (the highest technical difficulty score) – also caused by using two programming environments simultaneously. Despite the greater incidence of difficulties in hybrid programming than in visual, the most students subjectively rated the Java Bridge Code Generator positively (Table 6). Students marked code generation as helpful in creating applications and no correlation between responses and students' age was recorded (Table 7).

Textual programming was a challenge for students. Higher complexity of creating applications was reflected in:

- the lowest achieved difficulty score of created applications (Table 11),
- the lowest achieved average weighted performance (Figure 1),
- more significant differences between students in weighted performance during their independent work in T3 than V3 (Table 12 and Table 13),
- lower achieved weighted performance in the case of projects T3 than V3 for each student (with one exception).

While visual programming was mastered by all students, regardless of their age, in textual programming it is not possible to say so clearly. The weakest results were achieved especially by the youngest students with least experience.

Our findings that students performed better in visual than in textual programming are consistent with previous studies in sense that students who use block-based programming tools outperform the students who use textual programming tools (Deng et al., 2020; Weintrop and Wilensky, 2017).

RQ2: How do teenagers' attitudes toward learning programming in visual and textual way differ according to age and programming skills?

Despite the results that students' learning outcomes in visual programming was better than that in textual programming, the

subjective perception of benefits of visual programming by students was not so definite regardless of students' age and programming skills:

- although working with the project at the level of the folder structure appeared to be problematic, the students did not confirm such a perception with their own statements – only one student stated it as difficult,
- students do not find textual programming in Android Studio difficult – only the youngest student commented that it is difficult (Table 9),
- none of the students said that he/she cannot create the application in Android Studio,
- 50% of students said that they were most comfortable with the textual way of programming in Android Studio (no student mentioned visual programming in MIT AI 2) (Table 10).

These findings are in compliance with Weintrop and Wilensky (2017) who found no difference between students learning in block-based and text-based conditions with respect to confidence or enjoyment. Comparably to our results, authors report that students who program in textual way considered their programming experience as more similar to what professional programmers do and as more effective at improving their programming abilities. Our results are also in line with teachers' experience and views investigated by Attard and Busutil (2020) that using an interface such as App Inventor would attract students immediately due to its visual nature as opposed to text-based languages such as Java, but could be too limited for intermediate and advanced learners.

The motivation to program in a hybrid way was mainly to help with the textual programming. On the other hand, especially younger students were discouraged from such assistance by more complicated combined work with two programming environments simultaneously (Table 8). The motivation of students to program in a hybrid way also decreased with the acquired experience of students – the work with the two environments simultaneously was delaying for students. A different result could be recorded in the case of using a mediation tool, in which the possibility of programming in a visual and textual way is integrated within one programming environment.

Textual programming of mobile applications in professional programming environment Android Studio proved as a great challenge for students. Already during the first stage of visual programming, students expressed interest in the transition to such more professional way of programming. Despite the weaker measured objective results of students in textual programming, the positive subjective perception of their work persisted. This can be attributed to the high degree of motivation to create applications in this way regardless of age. This result coincides with the result achieved in our antecedent exploratory research (Tóth and Lovászová, 2018). In addition, students were motivated to continue textual programming of mobile applications even without the Java Bridge Library as assistance tool.

The following limitations should be considered when interpreting the results:

- Selection of research sample – a smaller number of participants allowed us to focus on a deeper understanding of the observed phenomenon. On the other hand, it is not possible to generalize the results to all students of secondary education. The research sample consisted of a selection of students with an increased interest in computer science and programming. In the case of a common sample of students, the results could deviate from ours.
- Choice of textual programming language and programming environment – to create mobile applications for the operating system Android, the Java programming language and the professional programming environment Android Studio were chosen. Choosing a programming language and programming environment more appropriate for teaching introductory programming could also affect results.

6 Conclusion

The aim of the article is to assess which way of programming, visual or textual, is appropriate for intermediate and advanced learners in the context of creating mobile applications. A case of teaching programming within the extracurricular course intended for students interested in creating mobile applications has been presented and studied. Based on the qualitative analysis of source codes, students' performance in visual, hybrid, and textual way has been evaluated. Furthermore, students' attitudes to the used ways of programming have been examined too.

The results showed that students were able to achieve better performance using visual programming than the other two ways of programming regardless of their age. In the case of textual programming, students' performance differed according to age. The weakest performance was achieved especially by the youngest students with the least experience. Regarding attitudes toward the way of programming, all students declared positive perception of textual programming in Android Studio despite many challenges they had to overcome. Hybrid visual/textual programming was used in order to help the transition between visual and textual programming. However, besides positive aspects of using hybrid tool in helping to generate textual code, combined use of two programming environments simultaneously during hybrid programming was perceived by students as complicated and delaying.

In the future, replication of this research under modified conditions may contribute to the problem of determining the appropriate way of learning programming mobile applications. The proposed modification of conditions is using a more comfortable programming tool with integrated visual and textual programming at the same time, which prevent difficulties with the complicated use of several tools at the same time. Furthermore, replication with a sample of students from common class would yield valuable results for the area of formal secondary education.

Literature:

1. Alrubaye, H., Ludi, S., Mkaouer, M.W.: Comparison of Block-Based and Hybrid-Based Programming Environments in Transferring Programming Skills to Text-Based Environment. In CASCON '19: Proceedings of the 29th Annual International Conference on Computer Science and Software Engineering, 100-109.
2. App Inventor (a): App Inventor Java Bridge. Available online: <http://www.appinventor.org/jbridge>.
3. App Inventor (b): Java Bridge Programming. Available online: <http://www.appinventor.org/jBridgeIntro>.
4. Attard, L., Busuttill, L.: Teacher Perspectives on Introducing Programming Constructs through Coding Mobile-Based Games to Secondary School Students. *Informatics in Education* 2020, 19, 543–568, <https://doi.org/10.15388/infedu.2020.24>.
5. Cheung, J.C.Y., Ngai, G., Chan, S.C.F., Lau, W.W.Y.: Filling the Gap in Programming Instruction: A Text-Enhanced Graphical Programming Environment for Junior High Students. *ACM SIGCSE Bulletin* 2009, 41, 276–280.
6. Dekhane, S., Xu, X., Tsoi, M.Y.: Mobile App Development to Increase Student Engagement and Problem Solving Skills. *Journal of Information Systems Education* 2013, 24, 299–308.
7. Deng, W., Pi, Z., Lei, W., Zhou, Q.: Zhang, W. Pencil Code Improves Learners' Computational Thinking and Computer Learning Attitude. *Comput Appl Eng Educ* 2020, 28, 90–104, <https://doi.org/10.1002/cae.22177>.
8. do Nascimento, M.D., Felix, I.M., Ferreira, B.M., de Souza, L.M., Dantas, D.L., de Oliveira Brandao, L., de Oliveira Brandao, A.: Which Visual Programming Language Best Suits Each School Level? A Look at Alice, IVProg, and Scratch. In Proceedings of the 2019 IEEE World Conference on Engineering Education (EDUNINE); IEEE: Lima, Peru, March 2019; 1–6, <https://doi.org/10.1109/EDUNINE.2019.8875788>.
9. Garneli, V., Giannakos, M.N., Chorianopoulos, K.: Computing Education in K-12 Schools: A Review of the Literature. In Proceedings of the 2015 IEEE Global Engineering Education Conference (EDUCON); IEEE: Tallinn, Estonia, March 2015; pp. 543–551, <http://dx.doi.org/10.1109/educon.2015.7096023>.
10. Hromkovič, J., Steffen, B.: Why Teaching Informatics in Schools Is as Important as Teaching Mathematics and Natural Sciences. In Informatics in Schools. Contributing to 21st Century Education; Kalaš, I., Mittermeir, R.T., Eds.; Lecture Notes in Computer Science; Springer Berlin Heidelberg: Berlin, Heidelberg, 2011; Vol. 7013, 21–30. ISBN 978-3-642-24721-7; https://doi.org/10.1007/978-3-642-24722-4_3.
11. Hsu, Y.-C., Ching, Y.-H.: Mobile App Design for Teaching and Learning: Educators' Experiences in an Online Graduate Course. *IRRODL* 2013, 14, 117–139, <https://doi.org/10.19173/irrodl.v14i4.1542>.
12. Javidi, G., Sheybani, E.: Teaching Computer Programming through Game Design: A Game-First Approach. *GSTF Journal on Computing* 2014, 4, 1, 17-22.
13. João, P., Nuno, D., Fábio, S.F., Ana, P.: A Cross-Analysis of Block-Based and Visual Programming Apps with Computer Science Student-Teachers. *Education Sciences* 2019, 9, 181, <https://doi.org/10.3390/educsci9030181>.
14. Koorsse, M., Cilliers, C., Calitz, A.: Programming Assistance Tools to Support the Learning of IT Programming in South African Secondary Schools. *Computers & Education* 2015, 82, 162–178, <https://doi.org/10.1016/j.compedu.2014.11.020>.
15. Krpan, D., Mladenovic, S., Zaharija, G.: Mediated Transfer from Visual to High-Level Programming Language. In Proceedings of the 2017 40th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO); IEEE: Opatija, Croatia, May 2017; 800–805, <https://doi.org/10.23919/MIPRO.2017.7973531>.
16. Mladenović, M., Boljat, I., Žanko, Ž.: Comparing Loops Misconceptions in Block-Based and Text-Based Programming Languages at the K-12 Level. *Educ Inf Technol* 2018, 23, 1483–1500, <https://doi.org/10.1007/s10639-017-9673-3>.
17. Musmarra, P.: Reflections on Teaching App Inventor: Challenges and Opportunities. In EC-TEL Practitioner Proceedings 2018: 13th European Conference on Technology Enhanced Learning, 2193, 2018.
18. Noone, M., Mooney, A., Nolan, K.: Hybrid Java: The Creation of a Hybrid Programming Environment. *Irish Journal of Technology Enhanced Learning* 2021, 5, <https://doi.org/10.22554/ijtel.v5i1.67>.
19. Ouahbi, I., Kaddari, F., Darhmaoui, H., Elachqar, A., Lahmine, S.: Learning Basic Programming Concepts by Creating Games with Scratch Programming Environment. *Procedia - Social and Behavioral Sciences* 2015, 191, 1479–1482, <https://doi.org/10.1016/j.sbspro.2015.04.224>.
20. Papadakis, S., Orfanakis, V.: Comparing Novice Programming Environments for Use in Secondary Education: App Inventor for Android vs. Alice. *IJTEL* 2018, 10, 44-72, <https://doi.org/10.1504/IJTEL.2018.088333>.
21. Paternò, F., Santoro, C.: End-User Development for Personalizing Applications, Things, and Robots. *International Journal of Human-Computer Studies* 2019, 131, 120–130, <https://doi.org/10.1016/j.ijhcs.2019.06.002>.
22. Perkins, D. N., Salomon, G.: Teaching for transfer. *Educational Leadership* 1988, 22-32.

23. Perkins, D. N., Salomon, G.: Transfer of Learning. International Encyclopedia of Education, Second Edition, Pergamon Press: Oxford, England, 1992.
24. Radosevic, D., Orehovacki, T., Lovrencic, A.: Verificator: Educational Tool for Learning Programming. *Informatics in Education* 2009, 8, 261–280, <https://doi.org/10.15388/infedu.2009.16>.
25. Saeli, M., Perrenet, J., Jochems, W. M. G., Zwaneveld, B.: Teaching Programming in Secondary School: A Pedagogical Content Knowledge Perspective. *Informatics in Education* 2011, 10, 1, 73–88, <https://doi.org/10.15388/infedu.2011.06>.
26. Strong, G., O'Carroll, S., Bresnihan, N.: A Block Based Editor for Python. In Proceedings of the Proceedings of the 13th Workshop in Primary and Secondary Computing Education; ACM: Potsdam Germany, October 4 2018; 1–2, <https://doi.org/10.1145/3265757.3265788>.
27. Tkáčová, Z., Šnajder, L., Guniš, J.: Introducing STEM Activities into Informatics Education through Mobile Apps Development. In ISSEP 2017 – The 10th International Conference on Informatics in Schools, University of Helsinki, Helsinki, Finland, 2017.
28. Tóth, T., Lovászová, G.: On Difficulties with Knowledge Transfer from Visual to Textual Programming. In DIVAI 2018 – The 12th international scientific conference on Distance Learning in Applied Informatics. Conference Proceedings. Wolters Kluwer ČR, a. s., 2018, 379–386.
29. Tóth, T., Michaličková, V.: From App Inventor to Java: A Strategy for Mediating the Transition. In 2018 16th International Conference on Emerging eLearning Technologies and Applications (ICETA), Stary Smokovec, Slovakia, 2018, 591–596, <https://doi.org/10.1109/ICETA.2018.8572156>.
30. Vega, J., Cañas, J. M.: PyBoKids: An Innovative Python-Based Educational Framework Using Real and Simulated Arduino Robots. *Electronics* 2019, 8, 899, <https://doi.org/10.3390/electronics8080899>.
31. Weintrop, D.: Minding the Gap between Blocks-Based and Text-Based Programming: Evaluating Introductory Programming Tools. In SIGCSE '15: Proceedings of the 46th ACM Technical Symposium on Computer Science Education 5, <http://doi.org/10.1145/2676723.2693622>.
32. Weintrop, D., Hansen, A. K., Harlow, D. B., Franklin, D.: Starting from Scratch: Outcomes of Early Computer Science Learning Experiences and Implications for What Comes Next. In Proceedings of the 2018 ACM Conference on International Computing Education Research (ICER '18). Association for Computing Machinery, New York, NY, USA, 2018, 142–150, <https://doi.org/10.1145/3230977.3230988>.
33. Weintrop, D., Wilensky, U.: Comparing Block-Based and Text-Based Programming in High School Computer Science Classrooms. *ACM Trans. Comput. Educ.* 2017, 18, 1–25, <https://doi.org/10.1145/3089799>.
34. Weintrop, D., Wilensky, U.: How Block-Based, Text-Based, and Hybrid Block/Text Modalities Shape Novice Programming Practices. *International Journal of Child-Computer Interaction* 2018, 17, 83–92, <https://doi.org/10.1016/j.ijcci.2018.04.005>.
35. Weintrop, D., Wilensky, U.: Transitioning from Introductory Block-Based and Text-Based Environments to Professional Programming Languages in High School Computer Science Classrooms. *Computers & Education* 2019, 142, 103646, <https://doi.org/10.1016/j.compedu.2019.103646>.
36. Wing, J. M.: Computational Thinking. *Communications of the ACM* 2006, 49, 3, 33–35, <http://doi.org/10.1145/1118178.1118215>.

Primary Paper Section: A

Secondary Paper Section: AM, IN

LEAVE OF PARENTS WITH EMPLOYEE STATUS IN THE CONTEXT OF EUROPEAN LEGISLATION

*SILVIA TRELOVÁ

Comenius University in Bratislava, Faculty of Management,
Odbojárov 10, 820 05 Bratislava 25, Slovak Republic
email: silvia.trelova@fm.uniba.sk

The support of the Faculty of Management, Comenius University in Bratislava, Slovakia is gratefully acknowledged.

Abstract: Parental rights concerning childcare are reflected in the area of labor law in the form of maternity leave, paternity leave and parental leave and from the point of view of social security law, the employee is entitled to income compensation in the form of a benefit or allowance after fulfilling certain legal conditions. In the article, the author distinguishes between individual types of leave for biological parents with the status of the employee, points out the degree of their use and the way of taking leave in individual EU countries, and also deals with the financial security of persons during the use of these types of leave. In processing the topic, the author analyzes and compares the legislation of EU countries and uses current data from the Mutual Information System on Social Protection. The aim of the paper is to point out the diversity of legal regulations and to assess the current state of employees' rights in EU countries.

Keywords: parent, maternity leave parent, paternity leave, parental leave, benefits

1 Introduction

Parenthood of working persons is associated with labor law and social law protection. The protection of working mothers and fathers is essential. As reported by Dudić, Z., Dudić, B., Agbaba, B., who analyze the European Social Charter, the right to the protection of an employed woman is important for humanity, especially from a biological point of view, as motherhood usually exhausts a woman and takes a long time.¹ However, we must point out that, in order to treat women and men equally, adequate protection applies not only to the mother but also to the father as the other parent due to the establishment of a close relationship with the child.

During the period of need for childcare, the employee exercises the right to time off from the employer corresponding to the individual phases of this period. In any case, a woman is the first who exercise her right to leave at the end of her pregnancy. Only after the birth of a child can we talk not only about the right to leave for a woman - mother, but also for a man - father. In many cases, the parent remains out of active employment not only for several weeks to months, but sometimes for several years, especially due to follow-up births.

The current trend of starting your own family is based on planning and one of the important aspects of family planning is the economic situation of future parents. The costs associated with the birth and care of a child are constantly increasing. Due to the childcare, the family is often provided with only one income, and therefore the provision of benefits, respectively social security contributions, helps to alleviate this situation. Such financial security is an important source of income, especially for families at an early age of the child. As stated by Hlásna and Horváth, state and society assistance to families with children must be understood as a significant social investment in the future development of society and not as a burden on the state budget.²

In connection with the birth and care of the child, the employee takes time off work. Within the EU countries, 3 basic types of leave for employed parents are identifiable: maternity leave, paternity leave and parental leave. In the following text, the article analyzes individual types of leaves on the basis of analysis and comparison of legislation of EU countries and use

of current data from the Mutual Information System on Social Protection of the EU (MISSOC), last updated on 1 July 2020³.

2 Maternity leave

Maternity leave is time off for employed women - pregnant employee and employed mothers shortly after giving birth. This type of leave is defined as the pre- and post-natal break from work taken by mothers of newly-born children⁴. It is used to prepare for the birth of a child, as well as to care for a newly-born child in the first months of his or her life, and therefore we can say that it includes both prenatal and postnatal periods. Maternity leave protects the health and safety of employed woman and the unborn child during later pregnancy and protects the mother for a certain period after the childbirth. The protection of the employed woman in this form is very important, in connection with the biological and reproductive function of the family and the development of the human population. Pregnancy and motherhood are "due to the indicated social dimension rightly classified as primary and classical social events"⁵ and „as important transitions in the life course of women should not entail the risk of being dismissed or losing earnings.“⁶ As "it is necessary to consider women not only as a subject of labor law, but also as a subject of family life of her own choice"⁷, the existence of a policy of reconciling work and family life is important, as women play not only occupational but also family and social.

The minimum length of maternity leave is governed by COUNCIL DIRECTIVE 92/85/EEC of 19 October 1992 on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding (further only „Directive 92/85/EEC“). The continuous period of maternity leave under Directive 92/85/EEC should be at least 14 weeks allocated before and/or after confinement (Article 8 (1)). This minimum duration of maternity leave includes compulsory maternity leave of at least 2 weeks allocated before and/or after confinement (Article 8 (2)). Given that individual EU countries can adjust the length of maternity leave and a way of taking it more favorable, the legal regulation of the maternity leave is different in individual EU Member States, it differs significantly.

Based on a comparison of individual national legal regulations and from data collected from the electronic and central database of the Mutual information system on social protection of the EU, we can state that there are considerable differences in the duration of maternity leave. The maternity leave takes several weeks to months. Bulgaria has the longest maternity leave (58.6 weeks). In the ranking of EU countries, Bulgaria is followed by Greece (43 weeks), Ireland (42 weeks), the Slovak Republic (34 weeks), the Czech Republic (28 weeks), Belgium and Hungary (24 weeks). Other countries have an even shorter maternity leave. Estonia, Luxembourg, Poland and Italy guarantee 20 weeks, Cyprus, Denmark, Lithuania, Romania provide 18 weeks and Finland 17 weeks of maternity leave. Women are entitled to

³ MISSOC. Comparative tables IV. Maternity/Paternity; IX. Family benefits. [online]. update 2020-07-01 [cit. 2020-07-20]. Available at: <https://www.missoc.org/missoc-database/comparative-tables/>

[online]. Available at: <https://www.missoc.org/missoc-database/comparative-tables/>

⁴ Aumayr-Pintar, Ch., Cabrita, J., Fric, K., Torres-Revinga, Y.: *Maternity leave provisions in the EU Member States: Duration and allowances*. Luxembourg: Publications Office of the European Union. As of 13 July 2015. [online]. [cit. 2020-09-20]. Available at: <https://www.eurofound.europa.eu/publications/customised-report/2015/working-conditions-law-and-regulation/maternity-leave-provisions-in-the-eu-member-states-duration-and-allowances>

⁵ Lacko, M., Olšovská, A.: *Materská a rodičovská dovolenka v SR*. In *Pracovní právo 2015 na téma Sledování pracovního a rodinného života*. Právnická fakulta Masarykovy univerzity 2015.

⁶ Hohnerlein, E.M. Maternity Leave. In: *The Wiley Blackwell Encyclopedia of Family Studies*. March 2016. DOI:10.1002/9781119085621.wbefs241

⁷ Hamulák, J., Freel, L., Nevičká, D.: The comparative analysis of women's status in labor relations in modern Slovakia and the Czech Republic [elektronický dokument] In: *Danube* [elektronický dokument]. - Roč. 11, č. 3 (2020), s. 214-227 [print]. - ISSN (print) 1804-6746.

¹ Dudić, Z., Dudić, B., Agbaba, B. Analysis of the European Social Charter and its importance for the protection of selected groups of working women. *Central European Journal of Labour Law and Personnel Management*, 3 (1), 2020. pp. 7-20. doi: 10.33382/cejllpm.2020.04.01

² Hlásna, S., Horváth, M.: *Komponenty kvality života detí, mládeže a dospelých a právnych aspektov*. Báčsky Petrovec: BPS EKSELENT DOO, 2012. 164 s.

16 weeks of maternity leave in France, the Netherlands, Latvia, Austria and Spain, and 15 weeks belong to women in Slovenia. However, there are also European countries that set a minimum duration of maternity leave, as stated in the Directive 92/85/EEC. The shortest maternity leave is in Croatia, Malta and Germany, which have maintained the minimum duration - 14 weeks, as it is enshrined in the Directive 92/85/EEC. Maternity leave takes in EU countries on average 22 weeks.

Portugal and Sweden have specific legislation. There is no specific legal regulation of the maternity leave and the relevant provisions are incorporated into the system of parental leave. The usual phrase maternity leave and parental leave is replaced by the uniform term parental leave, "in order to avoid differentiation in the provision of time for parents to care for a child in the legislative process itself"⁸. Portugal distinguishes between initial parental leave and extended parental leave. Part of the initial parental leave, which lasts 120-150 days in a row, is the leave reserved for the mother. A woman can voluntarily exhaust a maximum of 30 days before the birth (so-called pregnancy leave) and must exhaust 42 days after the birth (compulsory days). Leave reserved for the mother is in Sweden for a period of 60 days before childbirth (so-called pregnancy leave) and compulsory 90 days after childbirth.

The Directive 92/85/EEC does not regulate the way of taking maternity leave. Based on the analysis of individual national legal regulations, it can be stated that in all EU countries (27 states) the maternity leave is combined. It means that woman can take maternity leave before childbirth and after birth. The 16 EU countries have more compulsory weeks of maternity leave (before and / or after birth) than are enshrined in the Directive 92/85/EEC: Latvia - 4 weeks; the Netherlands, Ireland, Portugal (after childbirth), Spain - 6 weeks; Bulgaria - 6½ weeks; Germany (after childbirth), France - 8 weeks; Belgium, Malta - 10 weeks; Sweden (after childbirth) - 12 weeks; Czech Republic, Croatia, Poland (after childbirth), Slovak Republic - 14 weeks; Italy - 20 weeks. Such a provision of a longer compulsory maternity leave in the national regulations of individual states is positively assessed with regard to greater protection of the employee.

With regard to maternity leave, it should be emphasized that over recent years „many EU countries have made changes to the design of maternity leave provision through the introduction of, and changes to, the parental and paternity leave schemes, and by allowing mothers to transfer part of the maternity leave periods to the other parent“⁹. However, it does not belong to these countries, for example the Slovak Republic, where "women's maternity leave is a non-transferable right in contrast to other foreign legislation"¹⁰

As the EU Directive 92/85/EEC guarantees paid maternity leave at least at the level of sickness benefit in accordance with national legislation and/or national practice, all EU Member States provide paid maternity leave in accordance with the Directive 92/85/EEC. Cash benefits provided during maternity leave are generally high, mostly more than 70% of previous earnings. The twelve EU countries (Denmark, Estonia, France, the Netherlands, Croatia, Luxembourg, Germany, Poland, Portugal, Austria, Slovenia, Spain) explicitly provide the mother with full wage compensation (100%) during the maternity leave. There are also some countries that have a higher compensation in the first few days of maternity leave, lower in the following days and we can include Belgium, Finland, Malta among these countries.

3 Paternity leave

In some countries, in addition to maternity leave, paternity leave is provided. Paternity leave is time off for employed fathers. The reason for the father's absence from work is caring for a newly-born child literally for a few days in the first months after birth. „Maternity leave is generally a short period of leave for the father immediately following childbirth. Its aim is to enable fathers to assist the mother to recover from childbirth, which is also crucial in establishing breastfeeding, take care of the newborn as well as other children, attend to the registration of the birth and other family-related responsibilities. Paternity leave is either provided as a separate leave measure for fathers or included in the "special leave" provisions to which all employees are entitled. In that case, the birth of a child or "family events" are listed among the grounds for taking a specific number of days off, in addition to annual leave.“¹¹ The purpose of paternity leave is to create a greater bond between father and child. The father takes paternity leave in parallel with mother on maternity leave.

Despite the fact that paternity leave is used in the countries of the Union, until 1 August 2019 this type of leave was not enshrined in Union law. The change was brought about by DIRECTIVE (EU) 2019/1158 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 on work-life balance for parents and carers and repealing Council Directive 2010/18/EU (further only „Directive 2019/1158“). Directive 2019/1158 establishes the institute of paternity leave for the first time. EU Member States are required to enshrine in their national rules the institute of paternity leave in their legislation by 2 August 2022. The employed father (irrespective of the worker's marital or family status) has a right to paternity leave of 10 working days that is to be taken on the occasion of the birth of the worker's child. Member States are entitled to determine whether to allow paternity leave to be taken partly before or only after the birth of the child and whether to allow such leave to be taken in flexible ways (Article 4).

At present, paternity leave is regulated by the legislation of 24 EU countries. Paternity leave periods are generally much shorter than maternity leave periods, today they range from 2 days (Greece, Malta) to 4 weeks (Lithuania, Austria). The Netherlands, Finland and Spain provide more weeks of paternity leave.

Paternity leave is regulated separately in the national regulations of the EU countries. However, there are also exceptions, e.g. Finland, which is specific, because father-specific leave entitlements are part of the parental leave system rather than a separate right. Finland grants fathers 9 weeks of leave (54 calendar days with the exception of Sundays), of which 1-18 days can be taken by the father after the birth of the child in parallel with the mother (the other days would be taken after the mother's maternity leave).

Only three countries - Croatia, Germany and the Slovak Republic do not have the legislative regulation of paternity leave. These states must fully transpose institute of paternity leave into their national law. As six EU countries provide for shorter paternity leave (less than 10 working days), each of these states will have to adjust the length of paternity leave to at least the minimum in accordance with Directive 2019/1158. This legislative change must be made by 2 August 2022 at the latest.

Taking paternity leave is mostly voluntary, only Portugal and Italy have compulsory paternity leave. The 14 EU countries set a maximum period for the father to take paternity leave. For example, in the Netherlands it is within 4 weeks of the childbirth, in the Czech Republic within 6 weeks of the childbirth, in Belgium, Cyprus and France within 16 weeks of the childbirth, in Ireland and Latvia within 24 weeks of the

⁸ Hamulák, J., Nevická, D.: Švédsky model rodičovskej dovolenky - cesta k rovnoprávnosti? In: Baranová, H. (ed.), *Európsky pílter sociálnych práv a spoločnosť 5.0.* : 1. vyd. - Praha : Nakladatelství Leges, 2018. - S. 248-258 (Teoretik)

⁹ Strang, L., Broeks, M.: Maternity leave policies: trade-offs between labour market demands and health benefits for children. European Commission - Europa EU. 2016. [online]. [cit. 2020-09-23]. Available at: https://www.rand.org/pubs/research_reports/RR1734.html

¹⁰ Lacko, M.: *Materská a rodičovská dovolenka*. Praha: Leges, 2016

¹¹ ILO. *Maternity and paternity at work. Law and practice across the world*. 2014, p. 52. [online]. [cit. 2020-07-13]. Available at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_242615.pdf

childbirth. The legislation of Estonia can be considered specific as it has recently introduced the paternity leave 30 calendar days, which can be taken within the period of 30 days before the estimated date of confinement or up to 3 years after the birth of a child. Some countries allow for flexible paternity leave. The father can take paternity leave intermittently in Belgium, Estonia, the Netherlands, Portugal and Italy.

Directive 2019/1158 guarantees paid paternity leave of at least 10 working days. The amount of benefit must be at least at the level of the sickness benefit. Based on the comparison of national legal regulations and data from MISSOC it can be stated that all EU countries that currently enshrine the institute of paternity leave in their legislation already provide financial support for the father on paternity leave. Due to the short duration of paternity leave, employees often receive higher wage compensation, usually more than 70% of previous earnings. The 12 EU countries (Denmark, Estonia, France, Greece, the Netherlands, Luxembourg, Poland, Portugal, Romania, Slovenia, Spain, Italy) explicitly provide the father with full wage compensation (100%) during paternity leave.

4 Parental leave

The third type of leave for parents is parental leave. Parental leave is time off for employed parents (mother and father) due to the birth of a child for the purpose of caring for him until a certain age. Parental leave often complements special maternity leave and paternity leave and often, but not in all EU countries, follows immediately after maternity leave. Unlike maternity leave, parental leave is not primarily linked to the state of health of the employee who takes it. This type of leave represents time space for the upbringing of a child at an early age and serves to deepen the care of a small child. It should be emphasized that the care of a child is not a matter for one parent, but applies to both parents.

Parental leave is governed by COUNCIL DIRECTIVE 2010/18/EU of 8 March 2010 implementing the revised Framework Agreement on parental leave concluded by BUSINESSEUROPE, UEAPME, CEEP and ETUC and repealing Directive 96/34/EC (further only „Directive 2010/18/EU“) and already mentioned in DIRECTIVE (EU) 2019/1158 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 on work-life balance for parents and carers and repealing Council Directive 2010/18/EU. Directive 2010/18/EU will be repealed on 2 August 2022. The Directive 2019/1158 (Article 5) takes over and amends the institute of parental leave from Directive 2010/18/EU. New directive guarantees each parent an individual right to parental leave of at least 4 months, of which 2 months of parental leave must be non-transferable. The parent should exhaust the parental leave before the child reaches a specified age, up to a maximum of 8 years. The new legislation extends the minimum period of parental leave, which cannot be transferred from one parent to another, from 1 to 2 months. It should be emphasized that the proposal for a directive contained 4 non-transferable months. As we believe that this is a good incentive for parents (especially fathers) to stay with their child on parental leave, this longer length of non-transferable period could have been enshrined. „The purpose of the legislation on parental leave in European Union law is, in addition to the need to ensure the care of the child, to reconcile the parental and employment responsibilities of employees in the position of parents. EU law looks at parental leave not only in connection with the granting of paid leave, in whole or in part, due to the deepening of childcare, but also in connection with the return of an employee to work“¹².

If we take a closer look at the individual EU states, the duration of parental leave and the security of employees during parental leave vary considerably from one country to another. The length

of parental leave and the financial security of employees during parental leave vary considerably from one EU country to another. The length of parental leave in EU countries ranges from a few weeks to several years. Parents in Germany, Spain, Slovakia, the Czech Republic, Hungary and Estonia have the longest parental leave. Parental leave lasts in these countries a maximum of 3 years. The shortest parental leave is 16 weeks in Belgium, Greece, Croatia and Luxembourg. A specific country is Malta, where parental leave does not apply.

In some countries, certain periods of parental leave are reserved only for use by the mother or father ("mother quota" or "father quota"), which cannot be transferred to the other parent (non-transferable months). For example, in Sweden, out of 480 days of parental leave (240 for each parent), 90 days (3 months) are reserved for the mother and 90 days (3 months) for the father. „The potential goals of these policies are greater gender equality, both in the family and in the labour market, a better work-life-balance for families and stronger bonding between father and child.“¹³ In other countries, the total length of parental leave is non-transferable to the other parent (this applies, for example for the Slovak Republic).

The legal regulations of some states also allow the so-called "bonus weeks", if both parents share a certain part of parental leave. For example, in Portugal parental leave is increased by 30 days if each parent has taken 30 days of parental leave.

As individual countries differ significantly in the duration of parental leave, among the professional public, it is debated whether some states do not have too long and some states, on the contrary, too short parental leave. Dearing H. assesses the compliance of European countries' parental leave policies to an ideal model of leave in her article. The author points to the ideal model of parental leave that would best support gender equality in the division of labor. The ideal EGD model offers a "moderate" duration of 14 months of well-paid leave.¹⁴

In some countries, the parental leave must be taken continuously directly after maternity or paternity leave, in other countries the flexible taking of parental leave is possible. The parent can divide parental leave into several periods when the child is small. This permits the parents to choose to take parental leave as it suits them. For example, in the Slovak Republic, a parent can use up the part of the parental leave that he has not used up until the child's 3 year of age with the consent of the employer up to 5 years of age of the child. We evaluate this possibility positively.¹⁵ Research shows that men and women tend to take their leaves differently: women as continuous leave, even when flexible leave is available, while men more often take it flexibly and in shorter chunks.¹⁶

Although Directive 2010/18/EU does not guarantee financial coverage during parental leave, most EU countries (21 states) grant paid parental leave. Although entitlement to parental leave is an individual right (meaning that each parent has their own entitlement, parental leave is available to both parents), the provision of allowance during parental leave is often based on a family entitlement, which means that only one parent can apply for income support at any time. Parental allowance is:

¹³ Albrecht, C., Fichtl, A. and Redler, P.: *Fathers in Charge? Parental Leave Policies for Fathers in Europe*. ifo DICE Report 1/2017, March, Volume 15, pp. 49-51. [online]. [cit. 2020-08-29]. Available at: <https://www.ifo.de/DocDL/dice-report-2017-1-albrecht-fichtl-redler-march.pdf>

¹⁴ Dearing, H.: How to assess European leave policies regarding their compliance with an ideal leave model. In *Journal of European Social Policy*, 2015. [online]. [cit. 2020-08-20]. Available at: https://www.renner-institut.at/fileadmin/user_upload/images_pdf/fs/veranstaltungen/veranstaltungen_2015/2015-11-17_femmes_globales_Beruf_und_Familie_partnerschaftlich_gestalten/2015-11-17_Dearing_2016_EGD_L_Indikator.pdf

¹⁵ Treľová, S., Kulhánek, R.: Maternity and parental leave of employed mothers and fathers in the context of Slovak legislation. In: Education excellence and innovation management through Vision 2020. - Norristown : International business information management association, 2019. - S. 6698-6705. ISBN 978-0-9998551-2-6 [online]. [cit. 2020-07-15]. Available at: <https://ibima.org/accepted-paper/maternity-and-parental-leave-of-employed-mothers-and-fathers-in-the-context-of-slovak-legislation/>

¹⁶ Hegewisch, A., Gornick, J. C.: The impact of work-family policies on women's employment: A review of research from OECD countries, in *Community, Work & Family*, Vol. 4, Issue 2, pp. 119-138.

¹² Komendová, J.: Rodičovská dovolená pohledem práva EU – možnosti vyplývající z revidované rámcové dohody o rodičovské dovolené In *Pracovní právo 2015 na téma Sledování pracovního a rodinného života*. Právnická fakulta Masarykovy univerzity 2015.

- provided as a state benefit (Belgium, Bulgaria, France, the Slovak Republic), or
- linked to a period of previous income (the Czech Republic, Denmark, Estonia, Finland, Croatia, Lithuania, Latvia, Luxembourg, Hungary, Germany, Poland, Portugal, Austria, Romania, Slovenia, Sweden, Italy (17 countries) - usually 60 to 100% of previous income.

As six EU countries (Cyprus, Greece, the Netherlands, Ireland, Malta, Spain) do not provide a contribution at all, these countries will have to change their national legislation due to Directive 2019/1158, which guarantees paid parental leave of at least 2 non-transferable months at an appropriate level.

On the basis of the mentioned above, it can be concluded that „systems of parental leave differ significantly from one country to another. There is considerable variation in terms of eligibility, payment, duration, possible flexibility in usage, the age of the child to be cared for and transferability between parents“¹⁷.

5 Conclusion

The protection of mothers and fathers fulfilling their parental responsibilities is an integral part of legislation at European and national level, guaranteeing the employee an adequate minimum level of protection in relation to her or his maternity or parental responsibilities. Employees (female and male) have employment rights in connection with birth and childcare. These rights represent leave to a woman - mother before and / or after the birth of a child and a man - father after the birth of a child. Motherhood is associated exclusively with a woman, it is related to her pregnancy and subsequent childbirth. The purpose of maternity leave is to provide protection for women in the field of safety and health at work. Unlike maternity protection, parenthood protection is linked to both women and men and is related to the fulfilment of parental responsibilities in reconciling family and working life.

Summarizing of knowledge in area of maternity leave, parental leave and paternity leave can be difficult because of the wide variety of national systems which differ from each other. „There are large differences across countries in terms of the generosity of parental leave, such as the duration of leave, the level of benefits, job protection features, and eligibility.“¹⁸ However, based on a comparison of the legal regulations of the EU countries, we can state that in most EU member states, individual institutes of leave contain 2 elements:

- 1) providing leave in connection with the childbirth and childcare (maternity leave, parental leave, paternity leave); it also includes the protection of the employee's job during the leave (protection from dismissal)
- 2) securing income compensation during the taking time off (maternity leave, parental leave, paternity leave) through the provision of financial contributions (maternity, paternity and parental allowance).¹⁹

A comparison of EU Member States' legislation several years ago showed that countries with longer entitlement to leave provided lower benefits and countries with shorter entitlement to leave provided higher benefits. „In recent decades, many countries modified their maternity and parental leave programmes, changing elements such as length, wage replacement levels, and eligibility criteria“²⁰.

At present, the importance of the participation of both parents in the upbringing of the child is constantly emphasized. A more even distribution of paid leave for family reasons between women and men is to be introduced by Directive 2019/1158, which is currently the last protective legislative measure in EU in this area. It is important that the protection of specific categories of employees, which can also include employed mothers and employed fathers with children, is ensured. However, we point out that although various positive legislative measures are being taken for families with children, including to support the reconciliation of work and family life, positive measures of a non-legislative nature are also needed (compare with Hlásna, Horváth and Köksal)²¹.

Acknowledgements

The support of the Faculty of Management, Comenius University in Bratislava, Slovakia is gratefully acknowledged.

Literature:

1. Albrecht, C., Fichtl, A. and Redler, P.: *Fathers in Charge? Parental Leave Policies for Fathers in Europe*. ifo DICE Report 1/2017, March, Volume 15, pp. 49-51. [online]. [cit. 2020-08-29]. Available at: <https://www.ifo.de/DocDL/dice-report-2017-1-albrecht-fichtl-redler-march.pdf>
2. Antonini, M., Pullman, A., Fuller, S. and Andres L. Pre- and postpartum employment patterns: comparing leave policy reform in Canada and Switzerland. *Community, Work & Family*. May 2020. DOI: 10.1080/13668803.2020.1752620
3. Aumayr-Pintar, Ch., Cabrita, J., Fric, K., Torres-Revena, Y.: *Maternity leave provisions in the EU Member States: Duration and allowances*. Luxembourg: Publications Office of the European Union. As of 13 July 2015. [online]. [cit. 2020-09-20]. Available at: <https://www.eurofound.europa.eu/publications/cu-stomised-report/2015/working-conditions-law-and-regulation/maternity-leave-provisions-in-the-eu-member-states-duration-and-allowances>
4. Bastani, S., Blumkin, T., Micheletto, L. The Welfare-Enhancing Role of Parental Leave Mandates. *Journal of Law Economics and Organization*, 35(1). 2019. pp. 77-126
5. Dearing, H.: *How to assess European leave policies regarding their compliance with an ideal leave model*. *Journal of European Social Policy*, 2015. [online]. [cit. 2020-08-20]. Available at: https://www.renner-institut.at/fileadmin/user_upload/imag es_pdfs/veranstaltungen/veranstaltungen_2015/2015-11-17_femmes_globales_Beruf_und_Familie_partnerschaftlich_ges talten/2015-11-17_Dearing_2016_EGDL_Indikator.pdf
6. Dudić, Z., Dudić, B., Agbaba, B. Analysis of the European Social Charter and its importance for the protection of selected groups of working women. *Central European Journal of Labour Law and Personnel Management*, 3 (1), 2020. pp. 7-20. doi: 10.33382/cejllpm.2020.04.01
7. Hamulák, J., Freel, L., Nevická, D.: The comparative analysis of women's status in labor relations in modern Slovakia and the Czech Republic [elektronický dokument] In: *Danube* [elektronický dokument]. - Roč. 11, č. 3 (2020), s. 214-227 [print]. - ISSN (print) 1804-6746 URL: <https://content.sciencedo.com/view/journals/danb/11/3/article-p214.xml>
8. Hamulák, J., Nevická, D.: *Švédsky model rodičovskej dovolenky - cesta k rovnoprávnosti?* In Barancová, H. (ed.). *Európsky pilier sociálnych práv a spoločnosť 5.0*. - 1. vyd. - Praha: Nakladateľství Leges, 2018. - S. 248-258 (Teoretik) ISBN 978-80-7205-325-4.
9. Hanzelová, E., Kešelová, D.: *Zdroje a prekážky rastu zamestnanosti žien s dôrazom na stratégiu zosúladenia rodinného, pracovného a osobného života*. 2014. [online]. 02.01.2019 [cit. 2020-10-15]. Available at: https://www.ceit.sk/IVPR/images/IVPR/vyskum/2014/Hanzelova/2167_hanzelova_keselova_o.pdf
10. Hegewisch, A., Gornick, J. C.: *The impact of work-family policies on women's employment: A review of research from*

¹⁷ ILO. *Maternity and paternity at work. Law and practice across the world*. 2014, p. 52. [online]. [cit. 2020-07-13]. Available at: https://www.ilo.org/wcmsp5/groups/pu blic/-/dgreports/-/dcom/-/publ/documents/publication/wcms_242615.pdf

¹⁸ Bastani, S., Blumkin, T., Micheletto, L. The Welfare-Enhancing Role of Parental Leave Mandates. *Journal of Law Economics and Organization*, 35(1). 2019. pp. 77-126

¹⁹ Hanzelová, E., Kešelová, D.: *Zdroje a prekážky rastu zamestnanosti žien s dôrazom na stratégiu zosúladenia rodinného, pracovného a osobného života*. 2014. [online]. 02.01.2019 [cit. 2020-10-15]. Available at: https://www.ceit.sk/IVPR/images/IV PR/vyskum/2014/Hanzelova/2167_hanzelova_keselova_o.pdf

²⁰ Antonini, M., Pullman, A., Fuller, S. and Andres L. Pre- and postpartum employment patterns: comparing leave policy reform in Canada and Switzerland. *Community, Work & Family*. May 2020. DOI: 10.1080/13668803.2020.1752620

²¹ Hlásna, S., Horváth, M., Köksal, O.: Selected legislative components of legal guarantees applied to appropriate quality of life in the Slovak Republic. *International Journal of Academic Research Part B*; 2013; 5(3), 495-500.

OECD countries, in *Community, Work & Family*, Vol. 4, Issue 2, pp. 119–138.

11. Hlásna, S., Horváth, M. *Komponenty kvality života detí, mládeže a dospelých a právnych aspektov*. Báčsky Petrovec : BPS EKSELENT DOO, 2012. 164 s. ISBN: 978-86-89071-00-9.

12. Hlásna, S., Horváth, M., Köksal, O.: Selected legislative components of legal guarantees applied to appropriate quality of life in the Slovak Republic. *International Journal of Academic Research Part B*; 2013; 5(3), 495-500.

13. Hohnerlein, E.M. Maternity Leave. In: *The Wiley Blackwell Encyclopedia of Family Studies*. March 2016. DOI:10.1002/9781119085621.wbefs241

14. ILO. *Maternity and paternity at work. Law and practice across the world*. 2014, p. 52. [online]. [cit. 2020-07-13]. Available at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_242615.pdf

15. Komendová, J.: Rodičovská dovolená pohledem práva EU – možnosti vyplývající z revidované rámcové dohody o rodičovské dovolené In *Pracovní právo 2015 na téma Sňadování pracovního a rodinného života*. Právnická fakulta Masarykovy univerzity 2015.

16. Lacko, M.: *Materská a rodičovská dovolenka*. Praha: Leges, 2016. ISBN 978-807502-191-5.

17. Lacko, M., Olšovská, A.: Materská a rodičovská dovolenka v SR. In *Pracovní právo 2015 na téma Sňadování pracovního a rodinného života*. Právnická fakulta Masarykovy univerzity 2015.

18. MISSOC - Mutual Information System on Social Protection All EU countries, 2020. IV. Maternity/Paternity; IX. Family benefits. [online]. update 2020-07-01 [cit. 2020-07-20]. Available at: <https://www.missoc.org/missoc-database/comparative-tables/>

19. Strang, L., Broeks, M.: *Maternity leave policies: trade-offs between labour market demands and health benefits for children*. European Commission - Europa EU. 2016. [online]. [cit. 2020-09-23]. Available at: https://www.rand.org/pubs/research_reports/RR1734.html

20. Treľová, S., Kulhánek, R.: *Maternity and parental leave of employed mothers and fathers in the context of Slovak legislation*. In: Education excellence and innovation management through Vision 2020. - Norristown : International business information management association, 2019. - S. 6698-6705. ISBN 978-0-9998551-2-6 [online]. [cit. 2020-07-15]. Available at: <https://ibima.org/accepted-paper/maternity-and-parental-leave-of-employed-mothers-and-fathers-in-the-context-of-slovak-legislation/>

Primary Paper Section: A

Secondary Paper Section: AG

SOCIAL WORK AS A TOOL FOR ANOMIE CORRECTION ON SECOND STAGE OF PRIMARY SCHOOL

^aMIROSLAV TVRDOŇ, ^bPETER KONDRLA,
^cLUCIA MESÁROŠOVÁ

*Constantine the Philosopher University in Nitra, A. Hlinku 1,
949 74 Nitra, Slovakia*
email: ^amtvrdon@ukf.sk; ^bpkondrla@ukf.sk;
^cmesaroslucia@gmail.sk

This work was supported by the Slovak Research and Development Agency under the contract No. APVV-17-0158.

Abstract: Anomie is a sociological term that expresses the state that we can describe as a condition without law or rules. In the school environment, the condition is manifested by the failure to comply with the rules, and broken relationships between students as well as in relation to teachers and authorities in general. A state of anomie in the school environment reduces the effectiveness of the teaching process and creates an environment for the emergence of pathological phenomena that can affect the development of students and cause long-term negative consequences. In the pilot study, we selected the specific school environment that manifested the signs of anomie. Subsequently, we carried out research on the chosen environment with specific attention to the manifestations but also the perceptions of an anomic state in the school environment. We decided for our own research method, because the available methods from social sciences were developed for the needs of other target groups and are not suitable for the school environment. The study results show specific manifestations of anomie in the behavior and thinking of students and teachers. It was confirmed that teachers and poor emphasis on the validity of the existing rules have a great impact on the emergence of anomie. The tendencies to develop pathological phenomena in the anomic environment were also confirmed. The study results in the specific findings that should be part of a holistic preventive programme.

Keywords: Anomie, values, pathological phenomena, reduction, teaching process.

1 Introduction

Social work is a profession that involves a wide range of responsibilities and one of them is participation in resolutions and assistance in the field of social and pathological factors in society. Many authors also include anomie there, a phenomenon that has not been studied sufficiently yet. For its multidimensionality and a low interest of professionals in the field of social work, it is almost invisible and unknown. The studies on anomie were conducted by sociologists – Schenk at the social level, and Ondrejko (2010) at the level of families in 2008. In the field of social work, we did not find any empirical studies on anomie. Therefore, our research is unique and imperfect in this respect. We implemented it in the school environment which is another unexplored area in the research of anomie. Some sociologists refer to anomie as to the Boudon's rebus. Boudon argues that sociology shall address important, generally complex problems and explain them. The problem is a rebus, a riddle or a puzzle and it must be "unravelling" or "put together" into a coherent image that would explain why it happened just like that, or why people acted just like that, or why they believed just what they believed, etc. In studying the problem, we will also try to find a way how to study anomie in the context of social work and to find appropriate solutions for practice of social workers collaborating with schools. The initial attempt in the study was to focus on four areas, using the Schenk's recommendation for measuring anomie in which he points to a common denominator in every single area.

An authority, a bearer of certain values and creator of norms that result from its spiritual orientation and personal attitudes, forms an environment that forms people who are subject to its influence. In our case and understanding of the studied issue, it is a link and a reciprocal chain influence from the highest authorities of the country, i.e. politicians who are responsible for the operation of the country and its institutions, to the staff of public institutions, to parents of children and to the child – student.

Anomie is a state that occurs during a period of significant changes in society. It results in:

- the loss of values that were significant and valid in society and formed a non-institutionalised regulatory system of behaviour in society;
- the gradual breakdown of norms and mistrust of the sanction system which form the institutionalised regulatory system of behaviour in society;
- the gradual social numbness and diminishing social interaction;
- the mistrust of the state authorities and state institutions;
- the lack of certainty, the ambiguity of the future and objectives of society;
- indifference, helplessness which can lead to suicide.

2 Methodology

School social workers focus on the individual's ability to cope with the environmental demands and on the environment itself which influences the behavior. It can be a supportive, flexible, but also rigid or deficit environment with lacking resources, etc. Therefore, it is necessary to consider the aspects preventing the optimal functioning of the individual, particularly the resources, expectations linked to individual roles and finally legislation, policy measures, social policy instruments, etc. (Skyba, Šoltésová, 2014). Thus, anomie also affects state institutions, not just societies in general. Since research on anomie in the school environment was not conducted in Slovakia and we did not find foreign studies on anomie focused on schools, it was necessary to elaborate a brand-new model. We chose one primary school, with a sample of second-stage students and teachers. We focused our study on four areas: Norms; Values; Social opinions; and Personal attitudes. A link between the four areas are the authorities – teachers and parents as the bearers of norms, values and personal attitudes. A teacher as part of a state institution whose required qualification is a master's degree in teaching. The teacher must meet the regulations of the Ministry of Education, i.e. he is an executive unit of a specific state sector. In this case, the student is the receiver of certain norms, values and personal attitudes. Thus, he is influenced by the set of information presented in the school environment. He is also influenced by the home family environment which absolutely influences the school environment. We tried to study these areas by both quantitative and qualitative methods. The study itself is a probe for the future in this field of research, because it is indeed not easy to handle this topic. In the context of social work, we will try to identify and describe specific manifestations of anomie and propose their inclusion in the preventive activities of social workers, which is also our main research objective.

Main research objective: To identify and describe the manifestations of anomie. Through the partial objectives, we will try to identify four areas of possible anomic manifestations.

Partial objective: To find out the opinions of teachers and students on the second stage of primary school on school norms, and what values students prefer.

1st research question: What is the opinion of the students on the second stage of primary school about school norms?

2nd research question: Which are the most common problems at school the teachers face with the students?

3th research question: What are the teachers' opinions on the values of the students on the second stage of primary school?

4th research question: What are the values preferred by the students on the second stage of primary school?

5th research question: What are the opinions of the students on the second stage of primary school on socially widespread views and politicians?

6th research question: What are the teachers' opinions on the school system and the teacher's social status?

7th research question: What would you like to change in the school system? What does not suit you and prevents you from quality teaching and education?

We chose the students on the second stage of primary school in the Nitra Region because their age corresponds to the early adolescent age, which is a period of transformation from childhood to adulthood, in which, according to the research on risk and antisocial behaviour, the development of risk behaviour was found already at the age of 12 years. The researchers in this area recommend focusing preventive and intervention programmes on children in the first stage of basic education before the age of 11 years (Sobotková a kol., 2014). The second stage is the sample of students of the fifth to ninth years of the primary school in the Nitra Region in the total number of 77. The study was conducted in March 2019.

We collected the data from 52 second-stage students, due to the high morbidity at school at the time. In the second data collection, we used a newly structured questionnaire and collected the responses from 65 out of 77 students. The second questionnaire focused more on relationships with the authorities and among peers and friends; we also detected common signs of students and their values which are crucial in the research on anomie as a certain global characteristic. There were 14 teachers, including three male teachers and 11 female teachers in the school. We included all 14 teachers in the study to get as much data as possible. The questionnaire was filled in only by ten teachers. Four teachers refused to participate in the study. One questionnaire was completed in an ironic nature with single-word statements; thus, we could not classify it as suitable for the use. Thus, in total, we received responses from nine teachers.

3 Results

Students' opinions on school norms and the preferred values in the students on the second stage of primary school in the Nitra Region.

Research question: *What is the opinion of the students on the second stage of primary school about school norms?*

Table 1. Percentage values of the statement ratings by the students on the second stage of primary school.

Statement rating by the students (marks from 1 to 5)	1 %(n)	2 %(n)	3 %(n)	4 %(n)	5 %(n)
I like when I have clear rules in school	21,56 (11)	41,17 (21)	31,37 (16)	0 (0)	3,92 (2)
The penalties for the violation of school rules are fair and effective	33,33 (17)	21,56 (11)	23,52 (12)	15,68 (8)	5,88 (3)
A teacher is a respectable authority for me	33,33 (17)	37,25 (19)	19,6 (10)	3,92 (2)	5,88 (3)
I can cope with and influence the problems that I have	33,33 (17)	39,21 (20)	21,56 (11)	3,92 (2)	1,96 (1)
A praise by teachers affects me positively	62,7	21,5	5,8	3,92	1,96

Research question: *Which are the most common problems at school the teachers face with the students?*

Only nine teachers of 14, i.e. 64.28 %, participated in the study. Therefore, we considered this number of teachers to be 100 %. Male participation was 100 %. One response by a female teacher was not included in the relevant statements, because the answers were in a single word and in an ironic nature.

The question about the most common problems the teachers face at school was answered as follows:

Table 2. The most common problems in school.

Categories	Frequency n (%)
Students' intolerance	3 (33,3%)
Students' indifference	4 (44,4%)
Students' failure to respect a authority	4 (44,4%)
Failure the respect the rules and violatios of the school rules	6 (66,6%)

Research question: *What are the teachers' opinions on the values of the students on the second stage of primary school?*

Table 3. General status of values in the students on the second stage of primary school.

Induced category	Description of the category
Education is not important	... children don't care about education...
Fame and money	... firstly, there is fake fame, immediately followed by lots of money ...

The headteacher of the primary school in the Nitra Region perceives the absence of some values as a general phenomenon. The headteacher also perceives the reason why education is not important in the mistake of secondary schools which in their presentations promise students to be enrolled unconditionally despite the bad school results. Furthermore, she perceives a problem in the parents' attitude. "If you give a student a worse mark, he will go to another school. Will our school system go this way? Where will we get? Shall we be afraid to ask an engineer or a structural designer to design something, or see a doctor?" (All quotations are translated by the study author.) We gained the following responses from the questionnaire answered by the teachers:

Table 4. Which values do students find safety in nowadays?

Categories	Number of agreements and percentage
Friends	7 (77%)
Money and success	6 (66%)
Family	5 (55%)
Fun	4 (44%)

The question was answered by nine teachers. We state the categories with the most frequent agreements in the responses. Research question: *What are the values preferred by the students on the second stage of primary school?*

Table 5. Preferred values

Category	n (%)
Family	98%
Health	80,7%
Justice	76,9%
Friendship	76,4%
Entertainment	73%
Freedom	63,5%
Tolerance	59,6%
Honesty	57,8%
Career and success	44,2%
Education	38,4%
Physical attraction	36,5%
Money and wealth	34%
Faith	34%

Family was clearly the most important value for the students. It received $n98$ % of 1s (according to the rating by numerical marks at school). Health followed in the second place with a high percentage for 1s $n80.7$ %. Friendship was in the third place with $n76.4$ % for 1s obtained from the students. They were followed by: Justice $n76.9$ %; Entertainment $n73$ %; Freedom $n63.5$ %; Tolerance $n59.6$ %; Honesty $n57.8$ %; Career and success $n44.2$ %; Education $n38.4$ %; and Physical attraction, Money and wealth and Faith with the same number in the rating, i.e. $n36.5$ %. The opinions of the students on the second stage of the primary school in the Nitra Region on socially widespread views and politicians. Anomie is a social condition. That was the reason why we also asked about the views that often appear in society related to education. We asked about the politicians to find out the opinions about the highest authorities of the country that govern this country, who are lawmakers and law bearers. They are a role model for other members of the nation.

Research question: *What are the opinions of the students on the second stage of primary school on socially widespread views and politicians?*

Table 6. The students' opinions on the social statements.

Answer	1 (n)	2 (n)	3 (n)	4 (n)	5 (n)
If I want good job, I must get marks 1 at school.	29,4%	29,4%	31,4%	5,9%	3,9%
People who work honestly and do not lie earn a lot of money.	51%	9,8%	25,5%	9,8%	3,9%
If I want a good job, I must have good contacts, otherwise I will not get it.	21,5%	29,4%	35,3%	7,8%	7,8%

The students' answers suggest that they are either not interested in it, or they are mainly interested in money and not the citizens. They are perceived only through a negative view. The students' responses may suggest that they have their opinions from the home environment where politics is commented on through various dishonouring expressions about our officials. You cannot hear anything nice about them! The highest officials are the negative role models. The holders of law-making, values and work for the welfare of the nation are in the eyes of children only a bunch of thieves, unjust, selfish egoists who are not interested in the problems of people. This is really a very bad image of this governing authority of our country.

The opinions of primary school teachers in the Nitra Region on problems in the school system and the teacher's status in the social hierarchy. The teachers' opinions on the school system should point to the higher institutions responsible for school management. If the management by the Ministry of Education is positive, then the responses by the teachers must confirm this fact. The profession itself should be significant in society because it influences the standard of living of society. If it is so will be revealed to us in the teachers' statements.

Research question: *What are the teachers' opinions on the school system and the teacher's social status?*

"As we are treated by the country, the same way we are treated by parents; then the example is followed by children, i.e. students" (The headteacher of the primary school, 2019).

Table 8. What would you like to change in the school system?

Inducted categories	Description of the category
Return to the old type of education	... to return to education that was envied by the whole world ...
Professional staff at school	... we would need a good social worker who would remediate the school climate ...
Stricter and more accountable attitudes	... return to secondary school entrance interviews, stricter and more accountable attitudes ...
Encourage students to a trade	... for the more skilled, to renew workshops in school to enable them to find their way to a trade...

The interview with the school headteacher was conducted in the form of a semi-structured interview that was not recorded but based on notes. In many areas, she expressed lack of satisfaction with the management by the Ministry of Education and the trends leading to the low level of students' qualification. Related to this topic, we also asked the teachers through the questionnaire in which we asked them specifically for changes.

Table 9. What would you like to change in the school system? What does not suit you and prevents you from quality teaching and education?

Category	Frequency n (%)
A change in the content of curriculum	4 (44%)
Greater respect and competence of a teacher	3 (33%)
Return to old education as it was 25 years ago	2 (22%)

One of the teachers could not respond because he was not in education long enough to be able to respond. Some of the responses were: ... "Paper would allow to write a lot, but I do not have time to write it"; ... "Much I would like to change; this page would not even take it all." ... or one of the responses was: "I would like to change the unchangeable, replace the ladies and gentlemen in the Parliament, ministries, theorists by people with experience who know what the real situation in education is and what its needs are."

5 Conclusions

The analysis of the statements that were scaled suggests that the students more like than not if they have clear rules in school. They perceive that the penalties for the violation of school rules are fair and effective. Although we also found the comments that they are fair but not effective. However, we had not defined it correctly in our questionnaire. It would certainly be better to divide this one statement into two statements – separately on effectiveness and separately on justice. We also received more positive than negative ratings related to the statement on respect to the teacher's authority. Thus, the students respect teachers. From these results, we did not find significantly negative attitudes towards the rules and teacher's authority.

Which means that if students respect an authority, they also respect the school rules. Evidently, the students' responses show no problems with teachers and satisfaction with the rules. This way, however, is mainly typical for students who want to achieve something in life through study. For students who see the perspective in a specific occupation, or whose parents care about their education. However, when we compare it with the opinions of the teachers who were asked about the problems they face in classrooms and at school most often, the most frequent responses included a lack of respect for the rules, a lack of respect for teachers' instructions, a lack of respect for authority, or indifference to education. If we take into account the results from the question about the teacher-student relationship, some teachers argue that it depends on the teacher and how he develops his relationship with students, whether he gains them, gives them clear boundaries, helps them, is interested in them, or he enforces respect based on his status towards students. Some teachers state that respect for a teacher is the result of the adults who do not have respect for teachers. The results from the category of social opinions will also confirm it. We are inclined to believe that the teacher gains respect more or less by his attitude, personality and ability to understand students and their needs at a given age. But the teacher's profession is a very challenging, significant occupation that must be done based on one's belief. The way towards today's students is much more challenging than at the time when what the teacher said was sacred, as stated by one of the teachers. The development is constantly progressing and brings new challenges. As Tokárová (2002) states on the present day as the time of globalisation where education meets significant social functions. Education has the potential to enable prevention, problem solving and acceleration of desired changes, but it depends on the ability of the pedagogical theory and practice to design future trends and respond to the current needs through education and school management policy. Which the teachers themselves are aware of. Students are a clear mirror of the time that does not bring clear rules, effective punishments and justice that they perceive so extremely sensitively. What students lack in their families is the clarity and effectiveness of rules that parents make for children and adhere to. Thus, they carry the problem with the rules from the family, as several teachers state. Vajda and Kósa (2005) state that the cause of family transformation is the fact that the possibilities of an individual for social integration are moving away from the family, and they attribute the differentiation of coexistence to anomie in society I. e., a lack of standards, which makes the reconciliation of important values of partners, life objectives and important decisions difficult. The importance is also played by a constant change in economic and labour circumstances, travelling for work between countries or regions, which makes permanent family integration impossible. Ondrejko (2010) states that social control requires the

existence of social norms and their bearers (such as the church, parents, science, school, public, justice, police); it also has its strategy (prevention, repression, legal policy, diversion, mediation) and sanctions (positive, negative). Insufficient social control results in insufficient social regulation and social corrosion and, lastly, social anomie. Our research points to weak respect for the teacher's authority, and thus there is a failure to respect the rules that this authority applies.

The results of studying anomie bring several findings that can be divided into three levels. The primary problems point to the gradual alienation, corrosion of relationships and loss of higher values. The secondary problems are in the area of addictions to technology and inability to spend free time creatively and healthily. The problems of intellectual development are tertiary. However, the levels are equal in their importance. The primary focus for social workers who work in the school environment is the area of interpersonal relationships.

Ensuring the optimal conditions for physical, psychological and social development is a nationwide task which the country should include in school, health and social policy programmes. Primary prevention should have "the nature of immunisation against undesirable social phenomena" and, in the context of social work, it should aim the information and social competency at the whole population of children and youth (Rosová, 2018). Its basic principle is the development of knowledge and promotion of a healthy lifestyle through the motivation of an individual to adapt his behaviour to the values, attitudes and principles that are accepted by most of society. (Martin, Rojas, Kralik, 2020). The action related to education in family and its guidance are considered the basis of the primary prevention action. In terms of methods, it is important to act through education and edification, in the form of discussions, lectures, leisure activities or in the form of special activities in cultural, health or sports areas, etc. We could say that all activities preventing problems can be included there (Schavel, Čišecký, Oláh, 2008). If school social work is defined in legislation and also practically implemented in schools, it can become a major benefit in eliminating the negative phenomena and stimulating the positive phenomena in the school environment and in strengthening the families which together with the school will create a single educational community. The vision of the headteacher of the school in the Nitra Region is similar: to create a family-type school that deserves support not only from teachers, students, parents but also social workers who can methodically solve problems with the family and know the legislation that may help families in solving their problems. In some cases, we detected the signs of the dysfunctional family environment, family problems and school problems, but they related to individuals and cannot be generalised. They might be dealt with at school. Anomie is not a pathological condition; it is a social phenomenon that occurs in society at the time of significant changes which differ from the existing traditional values and the way of life. Anomie is a phenomenon that points to a change that is happening at the present time and points out that it is necessary to make a change in certain essential areas, so that this phenomenon does not have the nature of the pathological state of society. Norms shall lead to the regulation of inappropriate, ill behaviour. Values are another regulator of behaviour that act as a non-institutionalised means. And personal attitudes are the result of the whole human being with their abilities to perceive, feel, think and make decisions according to the situation and consequences that result from it. Therefore, it will be appropriate for the future to develop a preventive programme focused on human values, creativity, intellectual and intuitive skills of students and edification in self-knowledge as compensation for inadequate religious explanations of meaning of life and its expression. (Pavlikova, Zalec, 2019; Ambrozy, Kralik, Poyner, 2018). We cannot propose a specific solution for practice, because it is necessary to study this issue more profoundly and broadly in order to take specific steps from the anomic state to such a state of society in the future in which it will not be normal that we will produce appliances for two years; that we will devastate the resources only for the profit; and that we will not treat nature with respect and we will not

unnecessarily use the quantities of chemicals just to make something easier, or to achieve higher profits at the expense of human, even planetary health. Where it will not be normal that we will throw the waste into water and contaminate the air by emissions, despite the fact that we have ecological technologies that are energy-efficient but do not bring such profits to certain groups of people who own energetic strategic enterprises. We are inclined towards the theory of Damian Kováč, who understands the concept of social prevention through the optimization of bio-psycho-socio-cultural-spiritual behaviour, while he does not perceive integration as a given fact, but as a result of self-formation through cultivation. The integration is most effective through the system regulators such as wisdom, tolerance, pro-sociality, accountability, conscientiousness, frugality, humility and meaningfulness of life (Matula, 2011). The anomic state shall lead children, adults and all of us to the improvement of our decisions towards the values that are necessary for life and for the lives of other feeling beings. According to Ondrejko (2010), anomie has more in common with the disruption of the value system of a relevant culture and society than with the infringement and violation of the law. We can give recommendations to teachers for their practice, which would help them improve relations with their students, or help them in teaching. But a teacher in the heart and head is not a trained teacher. A person must be born like that or become like that. Therefore, those who would need to change their approach reject it. And those who are teachers in their heart, do not need help. The school cannot pay for assistance that we as social workers could provide because it cannot allocate money from the budget, although such a worker, according to the words of the headteacher, would be very useful in their school. Also, most teachers in the school would welcome assistance by a social worker who would address what now the teachers must deal with, besides teaching – educating, doing a lot of paperwork and tackling their personal problems. A social worker can act in social policy, the school environment and social work with the family. An excellent strategic action for social work is in the school. The preventive programmes that the country should include in its programmes in this field could be carried out by educated, competent and working-with-their-heart social workers in the school environment. Related to both teachers and social workers, it is not only about their expertise but also their understanding of students and the feeling about their profession.

Literature:

1. Ambrozy, M., Kralik, R., Poyner, J.: The issue of periodization in Wittgenstein's philosophy of religion. In. *European Journal of Science and Theology* 14 (1), 2018. p. 115-124. ISSN 1841-0464.
2. Martín, J.G., Rojas, A.M., Kralik, R.: The problem of the 'individual' concept in the Kierkegaard's journals. In. *European Journal of Science and Theology* 16 (2), 2020. p. 39-46. ISSN 1841-0464.
3. Matula, Š.: Prevencia sociálnej patológie ako optimalizácia bio-psycho-socio-kultúro-spirituálnej regulácie správania. In. *Sociálna patológia a intervencia sociálnej práce*. Bratislava: VŠZaSP sv. Alžbety. 2011. p. 45-59. ISBN 978-80-8132-018-7.
4. Nielsen-Sobotková, V. a kol.: *Rizikové a antisociálne chování v adolescenci*. Praha : Grada Publishing. 2014. 152 p. ISBN 978-80-247-4042-3.
5. Ondrejko, P.: *Prejavy anómie v súčasnej slovenskej rodine (sociologická analýza stavu): záverečná správa z výskumu (VEGAI/0687/8)*. Nitra : Univerzita Konštantína Filozofa v Nitre: Filozofická fakulta. 2010. 115 p. ISBN 978-80-8094-834-4.
6. Pavlikova, M., Zalec, B.: Boj za človekov jaz in prístnost: Kierkegaardova kritika javnosti, uveljavljenega reda, medijev in lažnega krščanstva. In. *Bogoslovni vestnik - Theological Quarterly*. 4 (79), 2019. p. 1015–1026. ISSN 0006-5722.
7. Rosová, D.: *Prevencia v školských zariadeniach*. Košice : EQILIBRIA, s.r.o. 2018. 230 p. ISBN 978-80-8143-220-0.
8. Schavel, M., Čišecký, F., Oláh, M.: *Sociálna prevencia*. Bratislava : Vysoká školy zdravotníctva a sociálnej práce sv. Alžbety, Bratislava. 2008. 139 p. ISBN 978-80-98271-22-1.

9. Skyba, M., Šoltéssová, D.: *Service-learning vo vzdelávaní (školských) sociálnych pracovníkov a pracovníčok*. Prešov : Prešovská Univerzita. 2014. 148 p. ISBN 978-80-555-1156-6.
10. Tokárová, A.: Paradoxy globalizácie, vzdelanie a sociálny rozvoj. In. *Sbornik prací Filozofické fakulty Brněnské Univerzity*. Brno : Masarykova Univerzita. 2002. p. 9-29. ISBN 80-210- 2814-9.
11. Vajda, Z., Kósa, E.: *Neveléslektan*. Budapest : Osiris. 2005. 564 p. ISBN 978-96-338- 9728-7.

Primary Paper Section: A

Secondary Paper Section: AM, AO

PREDICTION OF STOCK INDICES USING ARTIFICIAL NEURAL NETWORKS AND TECHNICAL INDICATORS

^aMARTA URBANÍKOVÁ, ^bMICHAELA ŠTUBŇOVÁ,
^cJARMILA HUDÁKOVÁ, ^dVIERA PAPCUNOVÁ

Institute of Economics and Management, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra, 949 01 Nitra, Slovak Republic

email: ^a*murbanikova@ukf.sk*, ^b*mstubnova@ukf.sk*,
^c*jhudakova@ukf.sk*; ^d*vpapcunova@ukf.sk*

Acknowledgement: This paper was supported by the University Grant Agency of Constantine the Philosopher University in Nitra UGA no. VII/14/2021.

Abstract: Predicting the behaviour of stocks, stock indices, and currency exchange rates as accurately as possible is crucial for successful decisions makings in financial markets. Artificial neural networks have proven to be a suitable tool for predicting non-stationary financial time series. The paper aims to analyse the contribution of technical indicators to the accuracy of stock index price prediction using artificial neural networks. We develop a robust prediction model using a nonlinear autoregressive neural network with eight technical indicators as external inputs. The prediction model is applied to the price index of the Prague Stock Exchange (PX index). The use of technical indicators increases the prediction accuracy compared to the prediction model based on a nonlinear autoregressive neural network without any external inputs.

Keywords: nonlinear autoregressive neural network with external input, prediction, stock index, technical indicators.

1 Introduction

Predicting stock prices as accurately as possible is a fundamental aspect of successful trading in financial markets. Economic and political events often cause movements in financial markets. The COVID-19 coronavirus pandemic currently has an extensive impact on the global economy and financial markets. Several tools can be used to predict the direction of stock price movements, including fundamental analysis, technical analysis, behavioural analysis, statistical prediction methods, and artificial intelligence tools. Artificial intelligence tools have become powerful methods of stock price prediction. One of these tools is an artificial neural network (ANN). ANNs are massive parallel computing systems that tend to store information and make it available for further processing. They can describe the dynamics of non-stationary time series, making them a suitable tool for predicting financial time series. Already in the 1990s, research papers about prediction systems advising when to buy and sell stocks based on ANNs (Kimoto, Asakawa, Yoda, and Takeoka, 1990); trend prediction and reversal recognition system for the stock market using a dual-module neural network (Jang, Lai, Jiang, Pan, and Chien, 1991); and about ANNs for stock return volatility prediction (Catfolis, 1996) were published.

In recent years, researchers have focused on the possibility of improving the predictive capabilities of neural networks by creating hybrid models of neural networks and classical statistical methods, hybrid models of neural networks and other tools of artificial intelligence, and neural networks using external inputs. Examples of hybrid models of neural networks and classical statistical methods are deep feedforward neural network hybrid based models and long short-term memory based hybrid models for prediction of the volatility of stock price index, which include various generalized autoregressive conditional heteroscedasticity models, developed by Kim and Won (2018); an adaptive hybrid ensemble learning paradigm integrating complementary ensemble empirical mode decomposition, autoregressive integrated moving average and sparse Bayesian learning for crude oil price prediction, developed by Wu, Chen, Zhou, and Li (2019); and hybrid deep-learning framework, which includes the feature pre-processing module (based on isolation forest and least absolute shrinkage and selection operator), the deep learning-based point prediction module (combines the deep belief network, long-short-term memory neural network, and convolutional neural network), the error compensation module, and the probabilistic prediction module (based on quantile regression) for day-ahead electricity price

prediction, developed by Zhang, Li, and Ma (2020). Examples of hybrid models of neural networks and other tools of artificial intelligence are High-order-fuzzy-fluctuation-Trends-based Back Propagation Neural Network model for stock price prediction, developed by Guan, Dai, Zhao, and He (2018); hybrid model of the genetic algorithm and nonlinear autoregressive neural network with exogenous inputs for daily bitcoin price prediction, developed by Han, Kim, Jang, and Ri (2020); and multilayer perceptron-genetic algorithms model and multilayer perceptron-particle swarm optimization model for stock market trends prediction, developed by Ecer, Ardabili, Band, and Mosavi (2020).

The predictive capability of ANNs can be improved by using external inputs such as the technical indicators, which have proven to be suitable external inputs. Lahmiri (2017) analysed the predictive capability of ANNs using technical indicators (Middle band, Upper band, Lower band, Momentum, Acceleration, Exponential Moving Average –EMA, Relative Strength Index – RSI, and Moving Average Convergence/Divergence – MACD) for historical volatility of currency exchange rate prediction. The ANNs were compared with generalized autoregressive conditional heteroscedastic (GARCH) models and exponential generalized autoregressive conditional heteroscedastic (EGARCH) models. ANNs using technical indicators outperform these models in terms of the mean absolute error, the mean square error, and Theil's inequality coefficient. The results indicate Their simple and effective approach is promising for currency volatility prediction tasks. Lee and Soo (2017) compared the results of the recurrent convolutional neural networks with technical indicators and the technical analysis alone for stock price prediction. They used the same technical indicators (Moving Average – MA, Stochastic Oscillator %K – %K, Stochastic Oscillator %D – %D) for neural networks and technical analysis prediction. The recurrent convolutional neural networks with technical indicators outperform the technical analysis. Nelson, Pereira, and de Oliveira (2017) developed a long-short-term memory neural network prediction model using technical indicators. They compared the results with three machine learning techniques - multilayer perceptron, random forest, and a pseudo-random model that outputs a class based on probabilities following the class distribution; and three investment strategies – buy and hold, optimistic, and pseudo-random. The proposed long-short-term memory neural network with technical indicators displayed considerable gains in terms of prediction accuracy. Vargas, dos Anjos, Bichara, and Evsukoff (2018) compared stock price predictions of deep learning models using financial news titles and two different sets of technical indicators as input. The first set of technical indicators included %K, %D, Momentum, RSI, Rate of change, Larry William's %R (%R), Accumulation/Distribution Oscillator (AD), and Disparity. The second set of technical indicators included EMA, MACD, RSI, On Balance Volume (OBV), and Bollinger Bands. They compared two machine learning models – a hybrid model composed of a convolutional neural network for the financial news and a long-short-term memory neural network for technical indicators; and a long-short-term memory neural network only for technical indicators. The results indicated that the financial news played a crucial role in stabilizing the results and that there was almost no improvement when comparing different sets of technical indicators.

Chou and Lin (2019) developed a fuzzy neural network combined with technical indicators for the prediction of freight rate trend in the dry bulk shipping market. The prediction results were compared with the technical indicator approach and the fuzzy neural network approach. The best prediction of the Baltic Dry Index was obtained using the combination of a fuzzy neural network and technical indicators (%R, RSI, MACD, Commodity Channel Index – CCI, and MA). Lai, Chen, and Caraka (2019) introduced long-short-term memory neural network using

average previous five days' stock market information (open, high, low, volume, close) and technical indicators (%K, %D, MACD, RSI, and OBV). They predicted the stock price index using data from Taiwan Stock Exchange. Lan, Kung, Ou, Lin, Hu, and Wang (2019) improved Taiwan Semiconductor Manufacturing Company stock price predictions of ANNs by including technical indicators and exchange rates among the input data of the backpropagation neural network. Naik and Mohan (2019) selected relevant technical indicators for the ANN-based prediction model using the Boruta feature selection unit. They considered 33 different combinations of technical indicators (Simple Moving Average – SMA, EMA, Momentum, %K, %D, MACD, RSI, %R, AD, and CCI) for various periods. Selected technical indicators were used as inputs for the ANN regression prediction model. The obtained results were compared with results of ANN without technical indicators. The proposed ANN model with technical indicators outperforms ANN in terms of the mean absolute error and the root mean square error. Picasso, Merello, Ma, Oneto, and Cambria (2019) proposed the exploitation of a feedforward neural network architecture into a trend classification problem. The model used technical indicators (SMA, EMA, MACD, RSI, Bollinger Bands, %K, %D, True Range – TR, Average True Range – ATR, %R, and CR indicator) and sentiment of news articles as inputs. The proposed robust predictive model was able to predict the trend of a portfolio composed of the twenty most capitalized companies listed in the NASDAQ100 index.

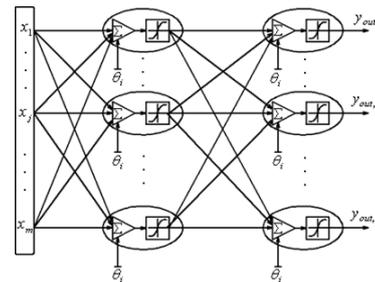
Alonso-Monsalve, Suarez-Cetrulo, Cervantes, and Quintana (2020) performed an analysis of the predictive capabilities of neural networks in predicting the trend of cryptocurrency exchange rates. ANNs used 18 trend-following technical indicators - AD, CCI, %R, MACD, Momentum, RSI, SMA (5, 10, 20, 30, and 60 minutes), %D, %K, and Weighted Moving Average (WMA) (5, 10, 20, 30, and 60 minutes). The authors compared results of a convolutional neural network, a hybrid convolutional neural network and long-short-term memory neural network, a multilayer perceptron, and a radial basis function neural network. The results of the analyses showed that the most suitable neural network was a hybrid convolutional neural network and long-short-term memory neural network, which significantly outperformed all the rest analysed networks. A combination of the daily trading data, technical indicators, and macroeconomic variables as inputs was used by Gao, Zhang, and Yang (2020). They presented multilayer perceptron, long-short-term memory neural network, convolutional neural network, and attention-based neural network for the day ahead prediction of stock index price. They achieved the best results with the attention-based neural network using open/close price and trading volume (daily trading data), MACD and Average True Range (technical indicators), and exchange rate and interest rate (macroeconomic variables). Nabipour, Nayyeri, Jabani, Mosavi, Salwana, and Shahab (2020) analysed the predictive capabilities of a decision tree, a bagging, a random forest, an adaptive boosting, a gradient boosting, and an eXtremegradient boosting, and ANNs, a recurrent neural network, and a long-short-term memory network. They used ten technical indicators (SMA, WMA, Momentum, %K, %D, RSI, MACD, %R, AD, and CCI) as the inputs for each of the prediction models. They achieved the best prediction results using long-short-term memory neural network.

2 Artificial Neural Network

Artificial neural networks, one of the soft computing methods, can process data with imprecisions, uncertainties, and approximations. Complex problems, that are difficult to accurately describe by mathematical models, can be solved using ANNs and their complex algorithms (Ibrahim, 2016). ANNs are inspired by the human brain and its ability to learn. Learning enables ANNs to improve their performance and the accuracy of their results. A neuron, the basic building unit of the ANN, is a simplified model of a biological neuron with similar functions and structure. The neurons of the ANN process the information from their input with an activation function and transmit it via oriented weighted connections. These connections are organized

into layers - input layer, hidden layers, and output layer. The layers of the ANN differ in the sources of their inputs and the use of their outputs. The input layer processes the data of the independent variables (inputs of the ANN) and transmits it to the next network layer. Hidden layers process outputs from previous layers and transmit them to the next layer. The output layer processes the outputs of the previous hidden layer and gives the value of the dependent variable as an output (Parot, Michell, and Kristjanpoller, 2019, Yildirim, 2019). Figure 1 shows an architecture of a multilayer feedforward neural network. The signal proceeds through the network through directed connections in one direction – forward. Unlike static feedforward networks, the dynamic recurrent neural networks use not only the feedforward connections but also feedback connections that allow the network to store information for further use (Mahmud and Meesad, 2016).

Figure 1: Architecture of the multilayer neural network.



Source: Elaborated by the authors.

ANN learns and stores acquired knowledge by adjusting the connection's weight values and neuron threshold values (θ). The acquired knowledge is stored in the adjusted weights of the neural network connections. Several learning laws can be applied to the neural network training process. In the paper, we use Levenberg-Marquart (LM) learning algorithm, which is the fastest converging learning algorithm for ANNs that contain less than a few hundred weights (Shahbazi, Memarzadeh, and Gryz, 2016). Chandar, Sumathi, and Sivanandam (2015) achieved the best prediction accuracy of the foreign currency exchange rate using ANN trained with LM learning algorithm. The LM learning algorithm is a variation on the Backpropagation algorithm. Li, Cheng, Shi, and Huang (2012) described the Backpropagation algorithm in two steps. In the first step, the operating signal is propagated forward through the network layers, and the error signal is computed as the difference between the real and the expected network output. In the second step, the error signal is backpropagated through the network. To minimize the error signal and therefore optimize the network performance, the weight values and threshold values are adjusted using the gradient descent method. The slow speed of convergence is a disadvantage of the Backpropagation algorithm. LM algorithm is one of the variations of the Backpropagation algorithm, which speeds up the convergence.

The LM learning algorithm combines the gradient descent method and the Gauss-Newton method. It minimizes a non-linear function with a numerical solution (Gavin, 2020). According to Yu and Wilamowski (2011), the learning rule of LM algorithm is given by:

$$w_{k+1} = w_k - (J_k^T J_k + \mu I)^{-1} J_k e_k,$$

where w_{k+1} and w_k are components of weight vector w ; μ is a combination coefficient with positive value; I is the identity matrix; e_k is a vector of training errors defined as $e_k = y_k - \hat{y}_k$, where y_k are target values and \hat{y}_k are output values; J is the Jacobian matrix defined as:

$$J = \begin{bmatrix} \frac{\partial e_{1,1}}{\partial w_1} & \frac{\partial e_{1,1}}{\partial w_2} & \dots & \frac{\partial e_{1,1}}{\partial w_N} \\ \frac{\partial e_{1,2}}{\partial w_1} & \frac{\partial e_{1,2}}{\partial w_2} & \dots & \frac{\partial e_{1,2}}{\partial w_N} \\ \vdots & \vdots & \ddots & \vdots \\ \frac{\partial e_{1,M}}{\partial w_1} & \frac{\partial e_{1,M}}{\partial w_2} & \dots & \frac{\partial e_{1,M}}{\partial w_N} \\ \vdots & \vdots & \ddots & \vdots \\ \frac{\partial e_{P,1}}{\partial w_1} & \frac{\partial e_{P,1}}{\partial w_2} & \dots & \frac{\partial e_{P,1}}{\partial w_N} \\ \frac{\partial e_{P,2}}{\partial w_1} & \frac{\partial e_{P,2}}{\partial w_2} & \dots & \frac{\partial e_{P,2}}{\partial w_N} \\ \vdots & \vdots & \ddots & \vdots \\ \frac{\partial e_{P,M}}{\partial w_1} & \frac{\partial e_{P,M}}{\partial w_2} & \dots & \frac{\partial e_{P,M}}{\partial w_N} \end{bmatrix},$$

where N is a number of weights, M is a number of outputs and P is a number of patterns.

The dynamic neural networks are appropriate for the financial time series prediction due to the dependence of the financial time series values on its previous values. We use a nonlinear autoregressive neural network with external input (NARX) and a nonlinear autoregressive network (NAR) in the paper. NARX a recurrent dynamic network based on a linear autoregressive model with exogenous variables (ARX). NAR is a recurrent dynamic network based on a linear autoregressive model (AR). The architecture of both NARX network and NAR network consists of feedback connections and tapped delay lines (TDL). The TDL unit returns a vector consisting of input data from the current time-step to the required number of time delays (Stokes and Abou-Zaid, 2012). In supervised learning, the actual previous values of the time series are known and can be used to replace the feedback connections. After modification of the network to feedforward architecture, static Backpropagation in the network training process can be used, which reduces the time required for calculations. After training of the ANN, it is possible to iterate the prediction of several time steps ahead using the original network architecture containing the feedback connections. Leaving a purely feedforward architecture, the network would be able to predict only one-step-ahead. Equation (3) is the defining equation for the NARX model, and equation (4) is the defining equation for the NAR model (Shahbazi, Memarzadeh, and Gryz, 2016).

$$y(t) = F(y(t-1), y(t-2), \dots, y(t-d_y), u(t-1), u(t-2), \dots, u(t-d_u)),$$

$$y(k) = F(y(t-1), y(t-2), \dots, y(t-d_y)),$$

where $y(t)$ is the value of the financial time series at time t , d_y is a number of time delays for the financial time series, $u(t)$ is the value of the independent (external/exogenous) input signal at time t , and d_u is a number of time delays for the independent input signal.

3 Technical Indicators

Technical indicators are one group of tools of technical analysis. Technical analysis uses historical stock quotes (prices and trading volumes) for the prediction of possible behaviours of the stock prices. We classify technical indicators into four categories: trend indicators, momentum indicators, volatility indicators, and cycle indicators (Bley and Saad, 2020). Oriani and Coelho (2016) found that the use of technical indicators as inputs to Multilayer Perceptron leads to high-quality predictions of stock closing prices. A combination of Technical and Fundamental analysis-based indicators for stock pricing prediction using machine learning-based models was found most efficient by Beyaz, Tekiner, Zeng, and Keane (2018). In the following section, we present the technical indicators used in the paper with their mathematical formulas as given by Kara, Boyacioglu, and Baykan (2011) and Achelis (2003).

3.1 Technical indicators formulas

Simple Moving Average (SMA):

$$SMA(k)_t = \frac{\sum_{i=0}^k C_{t-i}}{k},$$

where C_t is the closing price at time t , and k is the number of time periods in the moving average.

Exponential Moving Average (EMA):

$$EMA(k)_t = EMA(k)_{t-1} + \alpha \cdot (C_t - EMA(k)_{t-1}),$$

where $\alpha = \frac{2}{k+1}$ is a smoothing factor.

Moving Average Convergence/Divergence (MACD):

$$MACD_t = EMA(12)_t - EMA(26)_t.$$

Relative Strength Index (RSI):

$$RSI_t = 100 - \frac{100}{1 + (\sum_{i=0}^{n-1} Up_{t-i}/n) / (\sum_{i=0}^{n-1} Dw_{t-i}/n)},$$

where Up_t is the upward price change at time t , and Dw_t is the downward price change at time t .

Momentum:

$$Momentum_t = C_t - C_{t-n}.$$

Accumulation/Distribution Oscillator (AD):

$$AD_t = \frac{H_t - C_{t-1}}{H_t - L_t},$$

where H_t is the high price at time t , and L_t is the low price at time t .

Stochastic Oscillator %K (%K):

$$\%K_t = \frac{C_t - LL_n}{HH_n - LL_n} \cdot 100,$$

where HH_n is the highest high in the last n days, and LL_n is the lowest low in the last n days. (3)

Stochastic Oscillator %D (%D): (4)

$$\%D_t = \frac{\sum_{i=0}^{n-1} \%K_{t-i}}{n}.$$

Larry William's %R (%R):

$$\%R_t = \frac{HH_n - C_t}{HH_n - LL_n} \cdot 100.$$

4 Data and methodology

We analyse the accuracy of the prediction of the PX index, the official price index of the Prague Stock Exchange, using ANNs and ANNs with technical indicators as external inputs. The PX index is a free-float weighted price index made up of the most liquid stocks, and it is calculated in real-time. The robust prediction models are developed using historical prices from January 5, 2000, to October 15, 2020, which represents 5214 values.

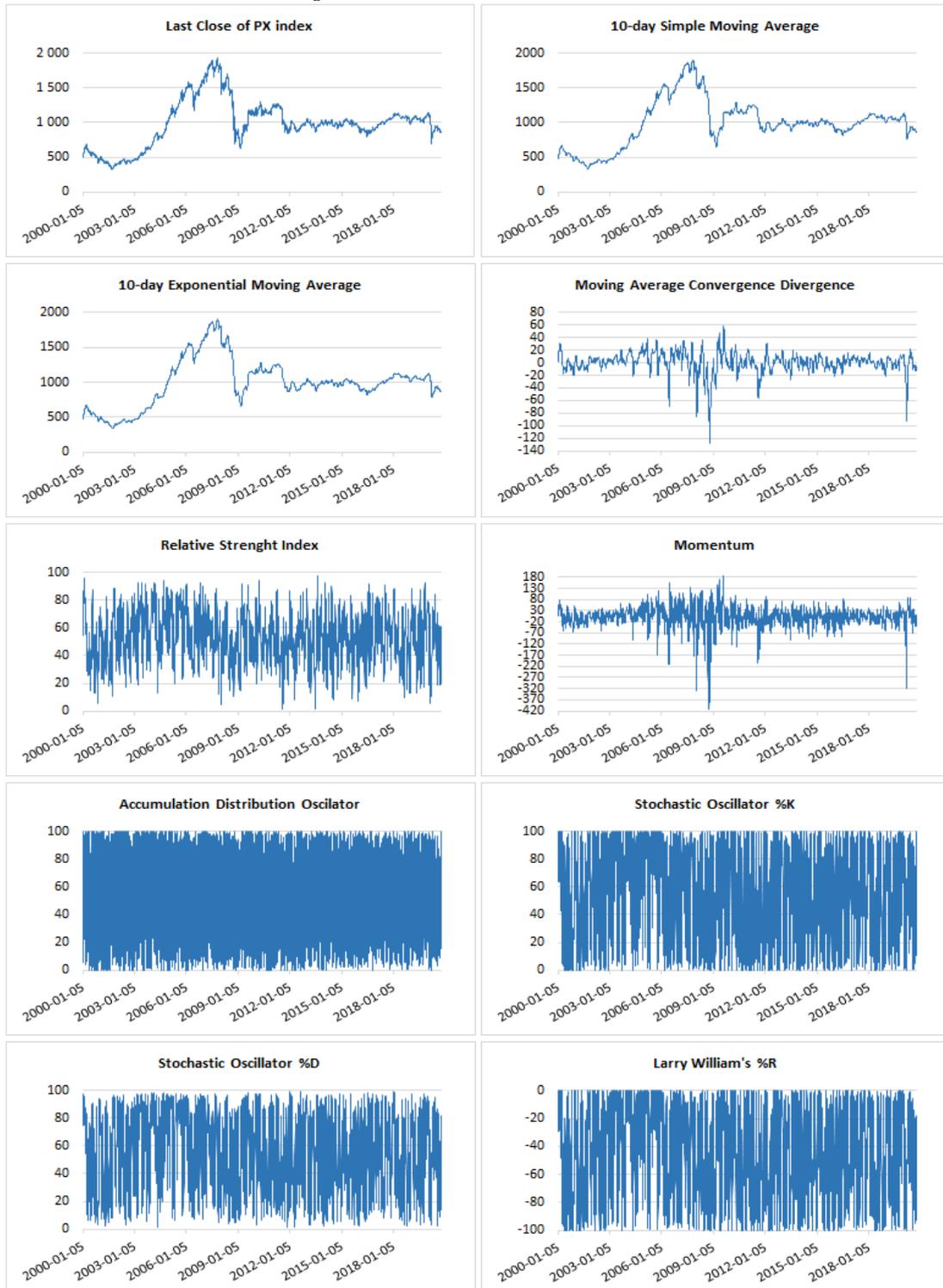
We calculate the values of the eight technical indicators of the PX index. We use 10-day SMA, 10-day EMA, MACD, RSI, Momentum based on 12-day difference, AD, %K based on 10-day difference, %D based on 3-day EMA, and %R based on 14-day difference. Figure 2 shows the tracking period of the PX index and the technical indicators.

The calculations are performed, and prediction models are constructed in the MATLAB R2019b software. We normalize the input data of the neural network to simplify the problem of the outliers in the neural network (Shahbazi, Memarzadeh, and Gryz, 2016). We use equation (14) for data normalization, which was proposed by Markechová, Stehlíková, and Tírpáková (2011).

$$U = \frac{X - \mu}{\sigma},$$

where U is the normalized variable, X is the original variable, μ is the mean value of the variable and σ is the standard deviation of the variable. We divide the pre-processed data into training set, validation set, and testing set in a ratio of 70:20:10. To predict the stock index, we develop and validate NARX networks with technical indicators as external (endogenous) inputs. To compare the NARX network performance, we develop and validate the NAR network. The networks use tansig transfer function and LM learning algorithm. (14)

Figure 2: The PX index and technical indicators.



Source: Elaborated by the authors based on data from Prague Stock Exchange (2020).

We optimize the network architecture of both NARX and NAR networks, using different numbers of the hidden layer's neurons and the different number of time delays. We construct networks with 5, 10, 15, 20, 25, 30 days' time delay and 5, 10, 15, 20, 25, 30 neurons in the hidden layer for each value of time delay. We construct, train, validate and test 36 NARX networks and 36 NAR networks. We use the mean square error (*MSE*) and the determination coefficient (R^2) to evaluate the network performance. We calculate *MSE* and R^2 values for training, validation, and test data set.

$$MSE = \frac{1}{n} \sum_{i=1}^n (y_i - \hat{y}_i)^2,$$

$$R^2 = 1 - \frac{\sum_{i=1}^n (y_i - \hat{y}_i)^2}{\sum_{i=1}^n (y_i - \bar{y})^2},$$

where n is the number of data points, y_i are target values, \hat{y}_i are output values and \bar{y} is the mean of target values.

5 Results and discussion

We compare the performance of the NARX network with technical indicators as external inputs and the NAR network for the PX index prediction. We construct, train, validate and test 36 NARX networks and 36 NAR networks. To visualize the results

of the developed networks, we select the network with the best prediction accuracy for each of the used time delays for both NARX and NAR networks. Table 1 shows these results. We use the *MSE* values for the validation data set to select the network with the highest prediction accuracy as proposed by Moghaddam, Moghaddam, and Esfandaryi (2016).

Among the created NARX networks, the network with 20 time delays and 5 neurons in the hidden layer achieves the best results. The network has the lowest *MSE* of the validation set with the value 1.4787E-03. Among the created NAR networks, the network with 15 time delays and 10 neurons in the hidden layer achieves the best results. The network has the lowest *MSE* of the validation set with the value 2.3930E-03. It is apparent that NARX networks with external inputs performed better for all the time delays compared to NAR networks. Neural networks using technical indicators as external inputs performed superior over other neural networks in the studies by Nelson, Pereira, and de Oliveira (2017), Naik and Mohan (2019), and Lan, Kung, Ou, Lin, Hu, and Wang (2019). Our results confirm these findings and indicate the suitability of using NARX networks with technical indicators as external inputs for stock index price prediction. The network architecture, the number of time delays, and the number of hidden layer neurons must be adapted and validated individually for each financial time series.

Tab. 1: NARX and NAR networks results.

	Time delays	Hidden neurons	<i>MSE</i>			R^2		
			Train	Valid	Test	Train	Valid	Test
NARX	5	15	1.2428E-03	1.5230E-03	1.7743E-03	9.9938E-01	9.9927E-01	9.9907E-01
	10	5	1.5008E-03	1.5310E-03	1.8497E-03	9.9924E-01	9.9929E-01	9.9900E-01
	15	5	1.4824E-03	1.4957E-03	2.1985E-03	9.9926E-01	9.9926E-01	9.9890E-01
	20	5	1.5508E-03	1.4787E-03	1.4044E-03	9.9922E-01	9.9930E-01	9.9925E-01
	25	10	1.1195E-03	1.8965E-03	1.9390E-03	9.9945E-01	9.9903E-01	9.9903E-01
	30	10	1.2586E-03	1.7898E-03	2.3093E-03	9.9939E-01	9.9908E-01	9.9885E-01
NAR	5	20	2.7630E-03	2.9624E-03	4.1591E-03	9.9629E-01	9.9729E-01	9.9288E-01
	10	25	3.1420E-03	2.7027E-03	2.5531E-03	9.9320E-01	9.9533E-01	9.9730E-01
	15	10	3.1498E-03	2.3930E-03	2.9726E-03	9.9220E-01	9.9341E-01	9.9820E-01
	20	5	2.9431E-03	3.1497E-03	2.9305E-03	9.9825E-01	9.9615E-01	9.9631E-01
	25	15	3.0106E-03	2.6585E-03	3.7965E-03	9.9122E-01	9.9735E-01	9.9406E-01
	30	5	2.9418E-03	2.9611E-03	3.7436E-03	9.9425E-01	9.9423E-01	9.9308E-01

Source: Elaborated by the authors.

6 Conclusion

Predicting the behaviour of stocks, stock indices, and currency exchange rates as accurately as possible is crucial for successful decisions makings in financial markets. Predicting the behaviour of financial time series is complicated by their non-stationarity and nonlinearity. ANNs can describe the dynamics of non-stationary time series, making them a suitable tool for predicting financial time series. In the paper, we analyse the predictive capabilities of ANNs using technical indicators as external (exogenous) inputs. We develop and validate a robust prediction model using the NARX network with eight technical indicators as external inputs. The prediction model is applied to the price index of the Prague Stock Exchange (PX index). The obtained prediction results are compared to results of the NAR network without any external inputs. The use of technical indicators increases the prediction accuracy, and we can therefore conclude that technical indicators are suitable as external inputs of ANNs for stock index price predictions.

Our research has the following limitations: the analysis of the predictive capabilities of ANNs is conducted on only one stock index, and the selection of the included technical indicators is only based on previous researches. In our future research, we will focus on the selection of the most appropriate technical indicators for ANN prediction models of stock index prices.

Literature:

1. Kimoto T, Asakawa K, Yoda M, Takeoka M. *Stock market prediction system with modular neural networks*. In: IJCNN

1990. Proceedings of International Joint Conference on Neural Networks; 1990 Jun 17-231, San Diego. San Diego: IEEE Computer Society. p. 1-6. DOI: 10.1109/IJCNN.1990.137535.

2. Jang GS, Lai FP, Jiang BW, Pan CC, Chien LH. *An intelligent trend prediction and reversal recognition system using dual-module neural networks*. In: Proceedings of the First International Conference on Artificial Intelligence Applications on Wall Street; 1991 Oct 09-11; New York. New York: IEEE Computer Society. p. 42-51. ISBN: 0-8186-2240-7. DOI: 10.1109/AIAWS.1991.236575.

3. Catfolis T. *Neural networks models for the prediction of stock return volatility*. In: ICNN 1996. Proceedings of International Conference on Neural Networks; 1996 Jun 03-06; Washington. Washington: IEEE Computer Society. p. 2118-2123. ISBN: 0-7803-3210-5. DOI: 10.1109/ICNN.1996.549229.

4. Kim HY, Won, CH. *Forecasting the volatility of stock price index: A hybrid model integrating LSTM with multiple GARCH-type models*. Expert Systems with Applications. 2018; 103: 25-37. ISSN: 0957-4174. DOI: 10.1016/j.eswa.2018.03.002.

5. Wu J, Chen Y, Zhou TF, Li TY. *An Adaptive Hybrid Learning Paradigm Integrating CEEMD, ARIMA and SBL for Crude Oil Price Forecasting*. Energies. 2019; 12(7): 1239:1-1239:23. ISSN: 1996-1073. DOI: 10.3390/en12071239.

6. Zhang RQ, Li GQ, Ma ZW. *A Deep Learning Based Hybrid Framework for Day-Ahead Electricity Price Forecasting*. IEEE Access. 2020; 8: 143423-143436. eISSN: 2169-3536. DOI: 10.1109/ACCESS.2020.3014241.

7. Guan HJ, Dai ZL, Zhao AW, He J. *A novel stock forecasting model based on High-order-fuzzy-fluctuation Trends and Back Propagation Neural Network*. PLoSONE. 2018; 13(2):

- e0192366:1- e0192366:15. eISSN: 1932-6203. DOI: 10.1371/journal.pone.0192366.
8. Han JB, Kim SH, Jang MH, Ri KS. *Using Genetic Algorithm and NARX Neural Network to Forecast Daily Bitcoin Price*. Computational Economics. 2020; 56(2): 337–353. eISSN: 1572-9974. DOI: 10.1007/s10614-019-09928-5.
 9. Ecer F, Ardabili S, Band SS, Mosavi A. *Training Multilayer Perceptron with Genetic Algorithms and Particle Swarm Optimization for Modeling Stock Price Index Prediction*. Entropy. 2020; 22(11): 1239:1-1239:19. ISSN: 1099-4300. DOI: 10.3390/e22111239.
 10. Lahmiri S. *Modeling and predicting historical volatility in exchange rate markets*. Physica A: Statistical Mechanics and its Applications. 2017; 471: 387-395. ISSN: 0378-4371. DOI: 10.1016/j.physa.2016.12.061.
 11. Lee CY, Soo VW. *Predict Stock Price with Financial News Based on Recurrent Convolutional Neural Networks*. In: TAAI 2017. Proceedings of 2017 Conference on Technologies and Applications of Artificial Intelligence; 2017 Dec 01-03; Taipei. Taipei: IEEE Computer Society. p. 160-165. eISSN: 2376-6824. DOI: 10.1109/TAAI.2017.27.
 12. Nelson DMQ, Pereira ACM, de Oliveira RA. *Stock Market's Price Movement Prediction With LSTM Neural Networks*. In: IJCNN 2017. Proceedings of 2017 International Joint Conference on Neural Networks; 2017 May 14-19; Anchorage. Anchorage: IEEE Computer Society. p. 1419-1426. eISSN: 2161-4407. DOI: 10.1109/IJCNN.2017.7966019.
 13. Vargas MR, dos Anjos CEM, Bichara GLG, Evsukoff AG. *Deep Learning for Stock Market Prediction Using Technical Indicators and Financial News Articles*. In: IJCN 2018. Proceedings of 2018 International Joint Conference on Neural Networks; 2018 Jul 08-13; Rio de Janeiro. Rio de Janeiro: IEEE Computer Society. pp. 1-8. eISSN: 2161-4407. DOI: 10.1109/IJCNN.2018.8489208.
 14. Chou CC, Lin KS. *A fuzzy neural network combined with technical indicators and its application to Baltic Dry Index forecasting*. Journal of Marine Engineering and Technology. 2019; 18(2): 82-91. eISSN: 2056-8487. DOI: 10.1080/20464177.2018.1495886.
 15. Lai CY, Chen RC, Caraka RE. *PREDICTION STOCK PRICE BASED ON DIFFERENT INDEX FACTORS USING LSTM*. In: ICMLC 2019. Proceedings of 2019 International Conference on Machine Learning and Cybernetics; 2019 Jul 07-10; Kobe. Kobe: IEEE Computer Society. p. 416-421. DOI: 10.1109/ICMLC48188.2019.8949162.
 16. Lan PC, Kung WL, Ou YL, Lin CY, Hu WC, Wang YH. *Machine learning model with technical analysis for stock price prediction: Empirical study of Semiconductor Company in Taiwan*. In: ISPACS 2019. Proceedings of 019 International Symposium on Intelligent Signal Processing and Communication Systems; 2019 Dec 03-06; Taipei. Taipei: IEEE Computer Society. p. 1-2. DOI: 10.1109/ISPACS48206.2019.8986293.
 17. Naik N, Mohan BR. *Optimal Feature Selection of Technical Indicator and Stock Prediction Using Machine Learning Technique*. In: ICETCE 2019. Proceedings of 2nd International Conference on Emerging Technologies in Computer Engineering: Microservices in Big Data Analytics; 2019 Feb 01-02; Jaipur. Jaipur: Springer International Publishing AG. p. 261-268. eISSN: 978-981-13-8300-7. DOI: 10.1007/978-981-13-8300-7_22.
 18. Picasso A, Merello S, Ma Y, Oneto L, Cambria E. *Technical analysis and sentiment embeddings for market trend prediction*. Expert Systems with Applications. 2019; 135: 60-70. ISSN: 0957-4174. DOI: 10.1016/j.eswa.2019.06.014.
 19. Alonso-Monsalve S, Suarez-Cetrulo AL, Cervantes A, Quintana D. *Convolution on neural networks for high-frequency trend prediction of cryptocurrency exchange rates using technical indicators*. Expert Systems with Applications. 2020; 149: 113250:1-113250:15. ISSN: 0957-4174. DOI: 10.1016/j.eswa.2020.113250.
 20. Gao PL, Zhang R, Yang X. *The Application of Stock Index Price Prediction with Neural Network*. Mathematical and Computational Applications. 2020; 25(3): 53:1-53:16. ISSN: 2297-8747. DOI: 10.3390/mca25030053.
 21. Nabipour M, Nayyeri P, Jabani H, Mosavi A, Salwana E, Shahab S. *Deep Learning for Stock Market Prediction*. Entropy. 2020; 22(8): 840:1-840:23. ISSN: 1099-4300. DOI: 10.3390/e22080840.
 22. Ibrahim D. *An overview of soft computing*. In: ICAFS 2016. Proceedings of 12th International Conference on Application of Fuzzy Systems and Soft Computing; 2016 Aug 29-30; Vienna. Vienna: Elsevier Science BV. p. 34-38. ISSN: 1877-0509. DOI: 10.1016/j.procs.2016.09.366.
 23. Parot A, Michell K, Kristjanpoller WD. *Using Artificial Neural Networks to forecast Exchange Rate, including VAR-VECM residual analysis and prediction linear combination*. Intelligent System in Accounting Finance and Management. 2019; 26(1): 3-15. ISSN: 1099-1174. DOI: 10.1002/isaf.1440.
 24. Yildirim H. *Property Value Assessment Using Artificial Neural Networks, Hedonic Regression and Nearest Neighbors Regression Methods*. Selcuk University Journal of Engineering, Science and Technology. 2019; 7(2): 387-404. ISSN: 2147-9364. DOI: 10.15317/Scitech.2019.207.
 25. Mahmud MS, Meesad P. *An innovative recurrent error-based neuro-fuzzy system with momentum for stock price prediction*. Soft Computing. 2016; 20(10): 4173-4191. ISSN: 1433-7479. DOI: 10.1007/s00500-015-1752-z.
 26. Shahbazi N, Memarzadeh M, Gryz J. *Forex Market Prediction Using NARX Neural Network with Bagging*. In: ICIEA 2016. Proceedings of 3th International Conference on Industrial Engineering and Applications; 2016 Apr 28-30; Hong Kong. Hong Kong: EDP Sciences. p. 19001:1-19001:5. DOI: 10.1051/mateconf/20166819001.
 27. Chandar S, Sumathi M, Sivanandam S. *Forecasting of Foreign Currency Exchange Rate Using Neural Network*. International Journal of Engineering and Technology. 2015; 7(1): 99-108. ISSN: 0975-4024.
 28. Li J, Cheng J, Shi J, Huang F. *Brief Introduction of Back Propagation (BP) Neural Network Algorithm and Its Improvement*. In: Jin D, Lin S, editors. Advances in Computer Science and Information Engineering. Advances in Intelligent and Soft Computing, vol 169. Berlin: Springer; 2012. p. 553-558. eISBN: 978-3-642-30223-7. DOI: 10.1007/978-3-642-30223-7_87.
 29. Gavin HP. *The Levenberg-Marquardt algorithm for nonlinear least squares curve-fitting problems*. Department of Civil and Environmental Engineering, Duke University. 2020: 1-15. Available from: <http://people.duke.edu/~hpgavin/ce281/lm.pdf>.
 30. Yu H, Wilamowski BM. *Levenberg-Marquardt training*. In: Wilamowski BM, Irwin JD, editors. The Industrial Electronics Handbook. Boca Raton: CRC Press, Taylor & Francis Group; 2011. p. 12:1-12:16. ISBN: 9781439802830. DOI: 0.1201/9781315218427-12.
 31. Stokes A, Abou-Zaid A. *Forecasting foreign exchange rates using artificial neural networks: A trader's approach*. International Journal of Monetary Economics and Finance. 2012; 5(4): 370-394. ISSN: 1752-0479. DOI: 10.1504/IJMEF.2012.052502.
 32. Bley J, Saad M. *An analysis of technical trading rules: The case of MENA markets*. Finance Research Letters. 2020; 33: 101182:1-101182:9. ISSN: 1544-6123. DOI: 10.1016/j.frl.2019.04.038.
 33. Oriani FB, Coelho GP. *Evaluating the Impact of Technical Indicators on Stock Forecasting*. In: SSCI 2016. Proceedings of 2016 IEEE Symposium Series on Computational Intelligence; 2016 Dec 06-09; Athens. Athens: IEEE Computer Society. p. 1-8. DOI: 10.1109/SSCI.2016.7850017.
 34. Beyaz E, Tekiner F, Zeng XJ, Keane JA. *Comparing Technical and Fundamental indicators in stock price forecasting*. In: HPCC/SmartCity/DSS 2018. Proceedings of 2018 IEEE 20th International Conference on High Performance Computing and Communications; IEEE 16th International Conference on Smart City; IEEE 4th International Conference on Data Science and Systems; 2018 Jun 28-30; Exeter. Exeter: IEEE Computer Society. p. 1607-1613. DOI: 10.1109/HPCC/SmartCity/DSS.2018.00262.
 35. Kara Y, Boyacioglu MA, Baykan OK. *Predicting direction of stock price index movement using artificial neural networks and support vector machines: The sample of the Istanbul Stock*

Exchange. Expert Systems with Applications. 2011; 38(5): 5311-5319. ISSN: 0957-4174. DOI: 10.1016/j.eswa.2010.10.027.

36. Achelis S. *Technical Analysis from A to Z*. 2003. Available from: https://www.academia.edu/34831627/Technical_Analysis_from_A_to_Z_Technical_Analysis_from_A_to_Z

37. Markechová D, Stehlíková B, Tirpáková A. *Štatistické metódy a ich aplikácie*. Nitra: Constantine the Philosopher University in Nitra; 2011. 534 p. ISBN: 978-80-8094-807-8.

38. Prague Stock Exchange. *PX*. [Internet]. Prague Stock Exchange, 2020 [updated 2020 Nov 06; cited 2020 Nov 06]. Available from <https://www.pse.cz/indexy/hodnoty-indexu/detail/XC0009698371?tab=detail-history>.

39. Moghaddam AH, Moghaddam MH, Esfandiyari M. *Stock market index prediction using artificial neural network*. Journal of Economics, Finance and Administrative Science. 2016; 21(41): 89-93. ISSN: 2077-1886. DOI: 10.1016/j.jefas.2016.07.002.

Primary Paper Section: A

Secondary Paper Section: AH

ENSURING THE RIGHTS AND LEGITIMATE INTERESTS OF CHILDREN AS PARTICIPANTS IN PUBLIC RELATIONS

^aMYKOLA VESELOV, ^bTETIANA REKUNENKO, ^cRUSLAN PYLYPIV, ^dNATALIA KHMELEVSKA, ^eMYKHAILO KOROL

^aState and Legal Disciplines Department of the Faculty № 2 of Kryvyi Rih Educational and Scientific Institute, Kryvyi Rih Educational and Scientific Institute of Donetsk Law Institute of the Ministry of Internal Affairs of Ukraine, Kryvyi Rih, Ukraine, ^bDepartment of Law Enforcement and Police Science, Donetsk Law Institute of Internal Affairs of Ukraine, Kryvyi Rih, Ukraine, ^cDepartment of Law, Open International University of Human Development Ukraine, Ivano-Frankivsk Branch, Ivano-Frankivsk, Ukraine, ^dDepartment of Criminal Law and Procedure, Leonid Yuzkov Khmelnytsky University of Management and Law, Khmelnytsky, Ukraine, ^eDepartment of Administrative Activity, National Academy of the State Border Guard Service of Ukraine, Khmelnytsky, Ukraine
email: ^aveselovnd1@ukr.net, ^brekunenko22@ukr.net, ^cruslanpylypiv@ukr.net, ^dstamp.ua@gmail.com, ^emakking@ukr.net

Abstract: The purpose of this article is to study the state of ensuring the rights and legitimate interests of children as participants in public relations based on international law. The results show inconsistencies in The Convention on the Rights of the Child (CRC) in ensuring children's rights and legitimate interests. The defined list of children's rights contains several contradictions and despite the declaration, in practice, the rights are not always fully guaranteed. CRC's allegations explicitly provide for the management of the child in the exercise of the right to self-expression by the methods that determine the participants in public relations by their own assessment of children's abilities.

Keywords: CRC norms, public-law relations, children's rights, socio-economic problems of the child.

1 Introduction

In recent years, more and more attention is paid to the awareness of the child as a full participant in public relations; there is an "explosion in awareness of the status of children as right-holders" (Nolan, 2019). Ensuring the rights and legitimate interests of children as participants in public relations involves addressing issues such as reducing child mortality, providing adequate nutrition, water resources and educational services (UNICEF, 2021), development and survival, socio-economic needs. As a result, children's participation in collective decision-making is becoming an increasingly important practical problem of public law relations. In the context of protecting the rights and interests of children, ways to solve the problem of participation are considered. The main ideas that are studied, there is vulnerability of children and social responsibility to children of participants of public-law relations. Social responsibility is enshrined in international and national regulations, but does little to address the issues of protection and participation (Tisdall, 2017). In the area of children's rights, children's participation attracts a lot of attention and is often seen as a key element in recognizing a child as an owner of rights and an agent of social change (Doek, 2018).

The purpose of the article is to study the rules for ensuring the rights and legitimate interests of children as participants in public relations based on international law.

2 Literature review

CRC norms are discussed in the scientific literature, but the contradictions between the legislation and the practice of protection of children's rights are little analyzed (Daiute, 2008). The Convention on the Rights of the Child (CRC), (United Nations Human Rights Office of the High Commissioner, 2021) defines children as full participants in public relations. According to Article 1 of the CRC, "a child is a person under the age of 18 if, under the law applicable to that child, he or she does not reach the age of majority earlier". According to the CRC

(United Nations Human Rights Office of the High Commissioner, 2021), a child is a person under the age of 18 inclusive. The socialization of the child must ensure its well-being and occur through compliance with the rule of law (Third and Collin, 2016; Livingstone & Third, 2017). UNICEF defines child protection as "prevention of violence and exploitation, response to such actions and abuse of children (commercial sexual exploitation, use of child labor, trafficking in human beings, etc.)". Child protection is seen as a state intervention in the lives of families through the provision of care and professional assistance. However, often professionals in the field of protection of the rights and interests of children solve the presence of problems, and not the children themselves identify their own problems, interests (Tisdall, 2017). Therefore, in practice, the policies to ensure the rights and interests of children are often ineffective. The CRC agrees on the concepts of the child and international relations, but in the process of protecting children's rights there are a number of problems (Daiute, 2008).

The signing of the CRC by 196 countries proves the importance of the child's participation in public relations and the progress of society in protecting the rights of children. For the first time the status of a child as a full-fledged person was defined in the Declaration of the Rights of the Child in 1924 (UNICEF). Criticism of the CRC in academia concerns "philosophical, constitutional, legal, political, intercultural, and methodological aspects" that may limit effectiveness. In particular, the priority in the document of the Western point of view is criticized (Wilcox & Naimark, 1991) and the hidden propaganda, which is put in utopian assumptions of CRC norms, which are stated in similar documents on human rights (Dahbour, 2003). However, activists (defenders of children's rights) clearly define the norms of the CRC to ensure the protection and interests of children, the use of pressure tools to develop programs for children's participation.

Among the main challenges are the child's right to participate in public relations and the right to protection (Livingstone & Third, 2017). CRC requires parents to make the decision that is best for the child in terms of the child's interests and opinions (Alper & Goggin, 2017). This creates unique opportunities for parents to ensure the protection of children's rights. However, the question arises: to what extent do parents have information about these opportunities and their own obligations under international law. The Munro study (2010) proposes a systematic approach to exploring ways to improve child protection as a complex adaptive system. This requires professionals who provide childcare services to adhere to the principle of honesty in their own experience of interacting with children in need of protection of rights and interests. The practice of child protection shows numerous difficulties in the work of professionals: excessive control, time-consuming design of protection procedures (Munro, 2010).

Doek (2015) examines the structure and features of the CRC, including the four basic principles, recognition of parental responsibility, increasing children's autonomy, and cultural characteristics. The principle is understood as a provision that is a priority in the implementation of CRC articles (Doek, 2015). Livingstone & Bulger (2014) argue about the need to balance risks and opportunities to ensure children's participation in their own rights and interests.

Thus, the scientific literature considers the following aspects of ensuring the rights and interests of children as participants in public relations: 1) the structure and features of international legal acts; 2) responsibilities, duties and rights of participants in public relations in the field of ensuring rights and interests; 3) challenges and problems of legislation; 4) basic provisions and principles of CRC. However, the issue of regulating the child's participation in public relations in the CRC is barely studied. Therefore, there is a question about the full value of ensuring the

rights and interests of the child as a participant in accordance with the CRC.

The main hypothesis of the study – the contradiction of the norms and provisions of the CRC does not ensure the rights and legitimate interests of the child as a participant in public relations.

3 Methodology

This study used a qualitative methodology based on the content analysis method of the Convention on the Rights of the Child (CRC), (United Nations Human Rights Office of the High Commissioner, n.d.). This article uses the methodology of CRC articles analysis (Doek, 2015), which ensures children's rights and interests as participants in legal relations, particularly an analysis of the contradictions in the CRC articles that regulate the rights and interests of the child. This study is a continuation of the children's rights and interests' research based on the analysis of CRC norms conducted by Doek (2015), Kilkelly (2015), Liefwaard & Doek (2015), Liefwaard & Sloth-Nielsen (2017), Livingstone & Bulger (2014), and Livingstone & Third (2017).

4 Results

The CRC supports society's interest in children's participation in matters and situations that concern them. A number of CRC articles can be grouped into: 1) the right to participate, including Article 12 (the child's views are given due consideration in matters concerning the child), 2) Article 13 (freedom of expression), 4) Article 14 (freedom of thought, conscience and religion), 5) Article 15 (freedom of association and peaceful assembly) and 6) Article 17 (access to information). The UN Committee on the Rights of the Child recognizes Article 12 as a general principle applicable to all measures taken by States Parties to implement the CRC. Although the very word "participation" is not mentioned in the CRC, the Committee refers to participation directly in its general comment on Article 12.

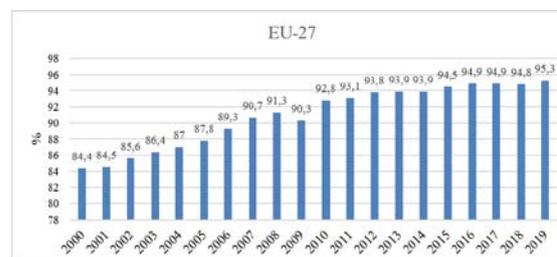
The most important decision of the CRC is to classify the provisions into four key principles: Article 2 on the elimination of discrimination; Article 3, paragraph 1 on the best protection of the interests of the child in any actions of all participants in public relations (courts, legislative and administrative bodies, social security bodies); Article 6 on the right to life and to ensure survival and healthy development; and Article 12 on ensuring the right of the child to express the child's own opinion. These provisions of the CRC were criticized for identifying with the principles, which in fact meant a contradiction of the concept of rights and distorted the legal obligations of the state. In the Committee's view, the application of other articles presupposes that these principles are taken into account (Doek, 2015).

Content analysis of CRC articles allows identifying the following basic rights of children: 1. The right to maintain personal contact with parents, except for conflicts of interest. 2. The right to receive information about the whereabouts of parents without harm. 3. The right to participate in the proceedings to convey one's opinion. 4. The right to formulate one's own views (including search, receipt and transfer of information) and to express them freely on issues that directly concern the child according to maturity. 5. The right to freedom of religion, thought or conscience. 6. The right to privacy and family life, secrecy of correspondence, inviolability of the home, protection of the law from interference with these rights. 7. The right to access information and materials from various sources. 8. The right to use services for children to care for them in case of employment of parents. 9. The right to special protection in the absence of a family. 10. The right of a defective child to special care. 11. The right to use the best quality medical services. 12. The right to enjoy social security benefits. 13. The right to a decent standard of living for all-round development. 14. The right to education, recreation, participation in games and entertainment, cultural life and employment in the arts. 15.

Protection against economic operation and performance of dangerous works.

Despite the declaration, in practice the rights are not always fully guaranteed, even in developed countries. For example, the right to education within the EU is not 100% guaranteed, as evidenced by the level of participation of preschool children in education at the appropriate level (Fig. 1). The right to education is classified into the following rights: "access to education, the quality and aims of education, human rights education, children's rights in education, and parents' rights over education" (Lundy & O'Lynn, 2019). Parents and guardians are responsible for ensuring the rights of the child in practice, especially in the area of participation in public relations. At the same time, the state is responsible for educational services.

Figure 1 Participation in early childhood education total sex (children between four years old and the age of compulsory primary education), % of the age group between 4-years-old and the starting age of compulsory education, 2000-2019



Source: Eurostat (2021)

The CRC provisions set out the responsibilities, rights and obligations of parents to ensure the rights and interests of the child. This demonstrates the recognition of the child as a member of the family and the obligation of the declaring States to provide parental assistance to guarantee and promote the rights of the child.

In particular, in Art. 27 defined: "Parent(s) or other caregivers have the primary responsibility for providing, within their abilities and financial capabilities, the living conditions necessary for the child's development".

The key role in ensuring the rights and interests of the child rests with the parents, as confirmed in Article 5: "States Parties shall respect the responsibilities, rights and responsibilities of the parents and, as appropriate, members of the extended family or community, as provided for in local custom, guardians or other persons legally responsible for the child, to properly manage and direct the child Convention of rights and to do so in accordance with the developing abilities of the child".

In addition, parents are responsible for the child's living conditions within their capabilities and financial resources necessary for the child's development. States parties are also obliged to assist parents in fulfilling their responsibilities and, if necessary, to provide material support, especially with regard to food, clothing and housing (United Nation, 2017). Thus, the participants in ensuring the rights and interests of the child are interconnected; they have a certain amount of responsibility in accordance with the capabilities, financial resources and powers. Realization of rights and interests, obligations are limited by the conditions in which they are realized. Implementation should not lead to various forms of child abuse, mistreatment or exploitation. Otherwise, the state has a duty to protect the rights of children and interests. Among the features of the CRC is the lack of specific provisions for child protection procedures to maximize the guarantee of parental and child rights.

The state interferes in family life and confidentiality in the event of a threat to the rights and interests of children, and the child and parents should have the right to legal or other assistance, the right to review the decision, for example, by a higher authority

or court. CRC rules govern the child's right to participate and express his or her views (Article 9, paragraph 9, and Article 12, paragraph 2).

Another important feature Convention there is a recognition of the potential and growth of the child's autonomy. This is reflected in the concept of ability development (Art. 5) and in the provisions of Art. 12, which provides for due consideration of the child's opinion according to the level of maturity. This regulated statement raises questions about the level of significance of the child's opinion in the family, in court proceedings, educational institutions, medical care institutions, preschool educational institutions. Children have the right to express themselves, but adults are responsible for the level of significance. Paternalism and the level of psychological and mental development of parents in this case will determine the level of participation of the child in public relations. In general, the opinion of older children is given more importance and weight, which corresponds to the concept of maturity and ability. Therefore, other participants in public relations must understand the assessment of the child's maturity by the parents. Vital decisions depend on this assessment (for example, on treatment methods, in the course of litigation). In general, despite the regulation of the concept of child participation, in general, the provision of rights and legitimate interests depends on the level of expertise of other participants in public relations. Absolute consideration of children's views can lead to a decision that is contrary to the best interests of the child. Children need protection from irrational decisions that are dangerous for full development.

Thus, the CRC recognizes the potential and autonomy of children, which are key factors in the right to participate in public relations (Article 12): "Article 12. 1. States Parties shall ensure that a child who is able to articulate his or her own views has the right to express those views freely on all matters affecting the child, with due regard to the child's age and maturity".

It should be noted that this article stipulates the obligation of the state to give the child the right to self-expression only if he can formulate an opinion. In case of inability to formulate what directly concerns children with disabilities, other participants in public-law relations make decisions. This again poses a danger and a threat to the decent standard of living and development of children. In Articles 13-16 the right to self-expression is supplemented and expanded. For example, paragraph 2 of Article 14 contains the following provision: "2. States Parties shall respect the rights and responsibilities of the parents and, where appropriate, of legal guardians, to guide the child in the exercise of his or her rights in a manner consistent with the evolving capacities of the child". This statement directly implies the management of the child in the exercise of the right to self-expression by the methods that determine the participants in public relations in accordance with their own assessment of children's abilities. Therefore, the child's active participation in decision-making is limited by the assessment of other participants.

The issue of violence against children dominates the current international and national agenda, in particular through the activities of the Special Representative of the Secretary-General for Violence against Children and many international and national NGOs and the systematic attention paid to this issue. It can be assumed that efforts to prevent and eradicate violence against children will continue and intensify to contribute to the ambitious goal 16.2 Sustainable Development Goals (SDG) – end all forms of violence against children by 2030. In the light of the broad definition of violence against children, efforts to achieve this goal should not be limited to physical, psychological and sexual violence, but should include all forms of neglect. Another topical and important issue is the prevention and elimination of all forms of exploitation, including economic and sexual exploitation and related trafficking in children (Articles 32, 34 and 35). Child labor, as the most well-known form of economic exploitation, is more specifically addressed in the

Convention ILO 138 on the Minimum Age for Employment and Convention 182 on the Elimination of the Worst Forms of Child Labor. Ongoing efforts to realize the child's right to protection from economic exploitation (Article 32 CRC), such as at the international level by the ILO's International Program on the Elimination of Child Labor (ILO-IPEC) and at the national level achieving another ambitious goal SDG 8.7: Take immediate and effective measures to eradicate forced labor and end modern-day slavery and trafficking, and to ensure that the worst forms of child labor, including the recruitment and use of child soldiers, are banned and eliminated and that all forms of child labor cease by 2025. All these problems can be summarized as the global victimization of children and require all kinds of legislative, educational and social measures to prevent this victimization and protect child victims.

5 Discussion

Participants in public relations in the field of ensuring the rights and interests of the child in accordance with various regulations are parents, law enforcement agencies, courts, preschools, social protection services for children, and schools. Despite the wide range of participants, in practice there are often threatening situations for children, which are obvious at the most critical and dangerous moment (sexual violence, abuse, etc.). On the other hand, the prevention and protection of children from such situations may limit the right to self-expression, the child's intentions to express their own opinions, to participate in public relations, to threaten the privacy of private life. Thus, there is a conflict of rights and interests, the solution of which must ensure a balance between avoiding threats to life, health, development and opportunities of the child in various spheres of public life.

In Europe, the European Court of Human Rights plays an important role in the realization of children's rights. Children may lodge a complaint with the Court alleging a violation of their rights under the European Convention on Human Rights and Fundamental Freedoms. The judgments of this Court show that they regularly refer, in particular, to the General Principles of the CRC, in particular Article 3 (1) on the best interests of the child and Article 12 on the right to be heard in court (Kilkelly, 2015). In addition, the Court of Justice, in dealing with EU law, has also promoted the recognition and realization of children's rights (Stalford, 2015).

The main challenge for the participating countries is the full implementation of the norms defined in the Convention in practice, as well as the full informing of children about their rights and ensuring an objective assessment by participants of the child's abilities and development. The realization of children's social, cultural and economic rights is also a challenge, as the problems of poverty, access to education; housing, food and clean drinking water remain worldwide. Measures to fully implement the norms should include legislative reform, development of a national strategy with coordination and control, accountability of the government for proper monitoring (for example, children's ombudsman) (CRC/GC/2002/2 2002), allocation of financial and human resources (CRC/C/GC/19 2016), systematic data collection and analysis, continuous training of specialists working with children or for children, and cooperation with civil society (CRC/GC/2003/5 2003). In addition to this general obligation, many articles of the CRC oblige States parties to take specific measures to implement them. The way in which States parties fulfill these obligations will vary from country to country, but an important feature of their actions should be the maximum participation of civil society organizations in ensuring the rights and interests of children.

Overall, progress has been made during the Convention in the area of legal reform, the realization of the right of the child to express his or her views, in particular by promoting the participation of children, in particular in combating violence against economic and sexual exploitation of children and juvenile justice (Liefwaard & Sloth). Nielsen 2017). In addition, important progress has been made at the regional level, in

particular in setting new standards and providing further guidance on the realization of children's rights. CRC norms have increased children's access to justice and made it possible to seek redress (for example, compensation for harm). Violations of children's rights have been brought to the attention of regional human rights courts and national courts (Liefwaard & Doek, 2015).

6 Conclusion

The UN Convention on the Rights of the Child is a key international legal instrument recognizing the human rights of children. Children's rights are not just a separate category of rights, but human rights. This recognition is fully supported by the 196 countries that have ratified the CRC. However, the analysis of the CRC, which should ensure the rights and interests of the child as a participant in public relations, shows that at present children cannot be fully involved. CRCs involve assessing a child's abilities and considering his or her views by other participants, which is always a subjective factor. Due to this, the child's participation in public relations is limited. Adults have the right to manage their rights and responsibilities according to their own assessments of the child's abilities. The importance of children's opinions is determined by the level of expertise of adults. The provisions of the CRC Convention provide for the management of the child in the exercise of the right to self-expression. Management is based on adult-defined methods. Therefore, today the protection of the rights and interests of children as participants in public relations are limited subjective assessments of adults. These conclusions confirm the hypothesis: the contradiction of the norms and provisions of the CRC does not ensure the rights and legitimate interests of the child as a participant in public relations.

The practical significance of the study is to analyze the level of children's participation in public relations in order to ensure the rights and legitimate interests of children. Further research should focus on certain areas of rights and legitimate interests: various forms of violence, including disregard for the underestimation of children's opinions, ensuring the rights of migrant children, reducing the level of illegal employment of children.

Literature:

1. Alper, M., & Goggin, G. *Digital technology and rights in the lives of children with disabilities*. New Media & Society, 19(5), 2017. 726–740. doi:10.1177/1461444816686323
2. European Convention on the Exercise of Children's Rights, ETS No.160. Strasbourg (25/01/1996). Available at: <https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/160>
3. Dabhour, O. *Illusion of the peoples: A critique of national self-determination*. Lexington Books. 2003.
4. Daiute, C. *The Rights of Children, the Rights of Nations: Developmental Theory and the Politics of Children's Rights*. Journal of Social Issues, 64(4), 2008. 701–723. doi:10.1111/j.1540-4560.2008.00585.x
5. Doek, J. E. *Article 6 CRC and the views of the CRC Committee*. Stellenbosch Law Review, 26(2), 2015. 254–271.
6. Eurostat. *Participation in early childhood education by sex*. Available at: https://ec.europa.eu/eurostat/cache/metadata/en/sdg_04_30_esmsip2.htm
7. Kilkelly, U. *The CRC in litigation under the ECHR*. In *Litigating the Rights of the Child*. 2015. pp. 193–209. Springer, Dordrecht.
8. Liefwaard, T., & Doek, J. E. *Litigating the Rights of the Child: Taking Stock after 25 Years of the CRC*. In *Litigating the Rights of the Child*. 2015. pp. 1–11. Springer, Dordrecht.
9. Liefwaard, T., & Sloth-Nielsen, J. *25 Years CRC: Reflecting on Successes, Failures and the Future*. In *The United Nations Convention on the Rights of the Child*. 2017. pp. 1–13. Brill Nijhoff.
10. Livingstone, S., & Bulger, M. A *Global Research Agenda for Children's Rights in the Digital Age*. Journal of Children and Media, 8(4), 2014. pp. 317–335. doi:10.1080/17482798.2014.961496
11. Livingstone, S., & Third, A. *Children and young people's rights in the digital age: An emerging agenda*. New Media & Society, 19(5), 2017. pp. 657–670. doi:10.1177/1461444816686318
12. Lundy L., & O'Lynn P. *The Education Rights of Children*. In: Kilkelly U., Liefwaard T. (eds) *International Human Rights of Children*. International Human Rights. Springer, Singapore. 2019. https://doi.org/10.1007/978-981-10-4184-6_11
13. Munro, E. Learning to reduce risk in child protection. *British Journal of Social Work*, 40(4), 2010. pp.1135–1151.
14. Nolan, A. *Children's economic and social rights*. *International Human Rights of Children*, 239. https://doi.org/10.1007/978-981-10-4184-6_10
15. Stalford, H. *The CRC in litigation under EU Law*. In *Litigating the Rights of the Child*. 2015. pp. 211–230. Springer, Dordrecht.
16. Third, A., & Collin, P. *Rethinking (children's and young people's) citizenship through dialogues on digital practice*. *Negotiating digital citizenship: Control, contest and culture*, 2016. pp. 41–60.
17. Tisdall, E. K. M. *Conceptualising children and young people's participation: Examining vulnerability, social accountability and co-production*. *The International Journal of Human Rights*, 21(1), 2017. pp. 59–75. <https://doi.org/10.1080/13642987.2016.1248125>
18. UNICEF. *Convention on the Rights of the Child*. Available at: <https://www.unicef.org/child-rights-convention>
19. UNICEF (a). *Learn about the convention on the rights of the child the world's most ratified human rights treaty, which provides a legal and moral framework for all of UNICEF's work*. Available at: <https://www.unicef-irc.org/portfolios/crc.html>
20. UNICEF (b). *History of child rights. International standards have advanced dramatically over the past century – explore the milestones*. Available at: <https://www.unicef.org/child-rights-convention/history-child-rights>
21. United Nation. *CRC/C/GC/21. Committee on the Rights of the Child. General comment No. 21 (2017) on children in street situations*. Available at: <https://undocs.org/pdf?symbol=ru/CRC/C/GC/21>
22. United Nations Human Rights Office of the High Commissioner (n. d.). *Convention on the Rights of the Child Adopted and opened for signature, ratification and accession by General Assembly resolution 44/25 of 20 November 1989 entry into force 2 September 1990, in accordance with article 49*. Available at: <https://www.ohchr.org/en/professionalinterest/pages/crc.aspx>
23. Wilcox, B. L., & Nalmark, H. (). *The rights of the child: Progress toward human dignity*. *American Psychologist*, 46(1), 1991. p. 49.

Primary Paper Section: A

Secondary Paper Section: AM

IMAGE IN NON-ARTISTIC TEXT AS A FACTOR DEVELOPING READING STRATEGIES OF SECONDARY TECHNICAL SCHOOLS' PUPILS

^aDANA VICHERKOVÁ, ^bMARKÉTA ŠENKERÍKOVÁ,
^cDENISA LICHÁ

University of Ostrava, Faculty of Education, Department of Education and Adult Education, Fráni Šrámka 3, Czech Republic

email: ^adana.vicherkova@osu.cz

^bmarketka.senkerikova@centrum.cz, ^cdenisa.licha@email.cz

This paper was written within the SGS project entitled "Factors influencing the level of reading strategies of pupils of secondary schools with technical specialization, OSU", registration number SGS01 / PDF / 2020, carried out at the Faculty of Education at the University of Ostrava in 2020.

Abstract: The paper focuses on the current problem of factors influencing the reading of non-artistic texts and the development of reading strategies of pupils of secondary technical schools in the Moravian-Silesian Region of the Czech Republic. The paper aims to reflect, describe, analyse and evaluate which types of non-artistic texts, images, and depictions develop pupils' reading strategies. The text presents selected results of the quantitatively oriented questionnaire survey focusing on the identification of the relationship between the pupil's notion of a non-artistic text and course of work with the image as factors influencing their reading strategies. The partial goal of the pilot research is to point out the factors influencing student teachers at the Faculty of Education of the University of Ostrava in working with non-artistic text, an image in the text and their understanding.

Keywords: image in a non-artistic text, reading strategies, secondary technical schools' pupils, factors of text comprehension, student teacher.

1 Introduction

Image is a part of the reader's education, developing their communication, reading comprehension. By reading image information, we learn to think critically. An effective image decoding can be listed among the reading strategies developing reading and visual, digital literacy of individuals and the whole society.

2 Working with image and text in retrospective

Working with image belongs among illustrative methods with their primary characteristic being a fast transfer of information, knowledge, experience scales. The beginnings of cave paintings as a type of communication can be dated back to prehistoric times. Illustrations (paintings) on the walls of temples occurred in Ancient Egypt, which is also the cradle of book illustrations, documented, e.g. in the Book of the Dead. Klimeš (2015) points out the fact that the picture-writing cannot be understood as the first illustration since it does not allow to separate the text and image part. "Picture-writing was a means of communication" (Klimeš, 2015, pp. 25 - 26). Image interaction reflects the life of society in relation to the natural, cultural, industrial and educational laws. A few researchers were interested in the interweaving of character types, e.g. Lessing, who perceived "natural" features in the painting and "arbitrary" features in the literature. Jacobson (1993) claims that it is possible to analyse the iconic features in the syntactic structure of language (Jacobson & Pomorska, 1993, p. 68). The principle of illustration is based on various scientific theories, e.g. philosophical, psychological, sensualistic, pedagogical. Sternberg (2009) explains that "it is characteristic for both media that neither of them contains all the features of the represented object, but there is always a certain selection from many features of it" (Sternberg, 2009, pp. 243 - 244). In contrast to non-artistic texts, we do not primarily encounter the form of pure character types in artistic texts and painting.

2.1 Text and image in the process of education

Maňák & Švec (2003, p 76) pointed out the relationship between the concept of the cognitive process and the principle of illustration "which requires the teaching to be based on the demonstration of phenomena or their representation". Linhart (1982) states that "perception is both a basic process of cognition and a governing component of human activity in which

human cognition has evolved and continues to develop" (Linhart, 1982, p. 151). Authors (Maňák & Švec, 2003, p. 77) classified the illustration into four categories as starting points for school teaching based on sensory perception, thus "demonstration of real objects and phenomena, realistic depiction of real objects and phenomena, their intentionally altered depiction and apprehension of reality through diagrams, graphs, signs, symbols, abstract models, etc.". By respecting the authors' view, images and drawing can be classified into so-called pre-machine aids according to the developmental point of view. Representations are understood as schemes, realistic images, static and dynamic projections (Maňák & Švec, 2003, p. 80). Images can be a part of tactile aids (e.g. maps, reliefs). Currently, we encounter educational visualisation not only in non-artistic texts, e.g. in professional texts (textbooks, encyclopaedias) but most frequently in the artistic texts (fiction). "The didactic (school) image is understood as a depiction of a phenomenon for use in the educational process, in various forms and modifications, regardless of its specific form of implementation." (Maňák & Švec, 2003, p. 83).

When working with text, it is appropriate to gradually or visually analyse individual parts of the image, which leads to a comprehension of the image as a whole. When working with different kinds of written information, it is appropriate to proceed in the same way as we learn to think critically and strategically. Dondis (1984) enumerated the essential visual elements, including "point, line, shape, direction, toning, colour, structure, scale, movement" (Dondis, 1984, p. 39). Mailaret (1975) pointed out three levels of image perception allowing pupils to read the image gradually. The first level includes the simple recognition of the object when pupils, e.g. enumerate individual parts of the image, in the plane of impressions from the viewing of the image. In the next level, pupils describe, characterise the picture, explain what they consider to be more or less important by so-called visual reading. The third level - reading the data contained in the image - is already a strategic manifestation of reading, with pupils "incorporating the information obtained from the image into the system of knowledge, which is further processed by cognitive operations" (Mailaret, 1975, p. 99). Image communication by graphic signs, symbols, schemes is, in the 21st century, a manifestation of the communication of the so-called information age, when it is not possible to measure precisely how much new information was created at a given moment. New innovative languages, which we understand as communication, image sharing are emerging in technically oriented fields. "The speech of images is closer to reality than verbal signs because the image brings a broader scope of the phenomenon, the information included in the image is more open and flexible than the language" (Maňák & Švec, 2003, p. 84).

In the contemporary world, we learn to think visually in everyday situations and create a visual communication culture. We process information through schematisation. We capture primary or specific features "which, in reality, or realistic representation, are lost in the globality of the substantial and insignificant, typical and accidental" (Maňák & Švec, 2003, p. 85). In modern educational resources, but also the texts of everyday life, we encounter the creation of mind maps (clustering), through which students recognise various relationships, deduce direct or distant connections, develop so-called reasoning, comparison, diagnosis, interpretation, reconstruction of knowledge, etc. Concept maps are currently a part of a diverse range of instructions. Working with the image supports the growth of creativity, technical thinking, entrepreneurship. Working with the image according to the valid curricular documents (FEP STVE, SEP) at the Czech technically focused secondary schools can be classified among tasks requiring more complex cognitive processes, e.g. independent creation of drawings, projects, tasks for practical application, tasks for discovering based on one's observations and

considerations, tasks requiring the solution of problematic professionally-oriented situations, etc. Pictorial (non-verbal) and verbal text in teaching texts are a means of social communication in teaching. Working with images helps to rationalise pupils' thinking.

3 Researches of Learning with image

Verbal learning is a subject of research for more than 100 years. The research of "learning from visual material" is experiencing an increasing interest today. Mareš (1995) argues that "in developed countries, research is being developed into how one learns from visual material and how visual material should be designed to make learning easier for people." (Mareš, 1995, p. 318). Research interest is focused e.g. on the problem of processing of visual information in non-artistic text. Several research surveys are interested in models of simple coding of information (by analysing both image and letters and their further processing in the activation of semantic memory and transfer to more abstract planes). Dual coding model considers a multidirectional information processing. Mareš (1995) comes up with the statement that in the process of image analysis, activation of nonverbal memory occurs simultaneously with the analysis of letters, sounds and with the transfer of their results to the verbal memory. The resulting concept thus possesses both verbal and non-verbal aspect. The sensoric-semantic model enriches the visual and written characteristics also by phonemic characteristic (Mareš, 1995, pp. 320 – 321). The result of the model of triple coding of information are "auditory logogen, visual logogen and pictogen, which pass into the cognitive system, which further processes them" (McLean – Thorne, 1994). In the levels of visual information communication, three levels (according to Mareš, 1995) can be distinguished: syntactic, semantic, pragmatic. Their functions e.g. decorative, representing, organising, interpreting, transforming can also be analysed in the didactically focused non-artistic texts. Mareš (1995) also draws attention to other functions of visual material, such as affective-motivational, function of attention concentration and cognitive-regulatory functions. Feming (1987), Rankin (1989) were also interested in possible approaches towards the diversity of functions of visual material. The research (Mareš, 1995) was focused on the relationship between psychodidactic and aesthetic functions of the visual material, e.g. *scientific character* of the illustration versus artistic metaphor, further to the "logic of the verbal expression of knowledge, the relationship between sign and symbol, the relationship between cognition and experience" (Mareš, 1995, p. 326). Klimeš (2015) who was interested in the relationship between text and illustration, states that the verbal text and its illustration "brings two different views, the result of which is the same meaning" (Klimeš, 2015, p. 103). The Trahorsch, Bláha, Janko (2018) research was focused on the problem of visuals in Geography textbooks and pointed out the terminological inaccuracy of the designation for the non - text - illustrative component of textbooks and also as well as the insufficient number of visuals in geography textbooks for the ISCED 1 age group. Research results pointed out the fact that "the quality of visuals can be problematic, as it can distort the visualised phenomenon or process or even cause misconceptions if the concept is inappropriately chosen" (Trahorsch, Bláha, Janko, 2018, p. 112). Park's (2012) research based on social constructivism and focused on the problem of using visualisation as a bridge to text understanding, the development of critical literacy, reading literacy. In a psychological research experiment, Daňková (2013) focused on the problem of applying the principle of illustration in the preparation of a psychology textbook. The results of this research confirmed that "active visualisation is necessary for good memorisation - own techniques of incorporating information into the already existing knowledge system" (Daňková, 2013, p. 41). Molnár, Tláškal (2012) researches suggest the decrease in the level of spatial imagination of pupils and point to a decline in pupils' competencies in the process of phenomena visualisation. They also emphasise the need to increase the level of reading and so-called visual speech as part of the language of a particular

subculture. Flood, Heath, Lapp (2008) also researched pupils' visual literacy.

3.1 Visual image, visual and reading literacy

A visually literate person can work with the image in the text correctly and functionally. Fulková (2012) states that an image "is a visual or mental expression arising from a certain impulse, containing specific characteristics and requiring a certain interpretation" (Fulková, 2002, p. 12). Image visualisation in electronic and paper texting is a factor that contributes to the development of visual and reading literacy, i.e. reading and digital strategies as significant components of functional literacy. "Visual literacy is so far understood mainly as a way to defend against the manipulative social effects of visual communication, especially in the media and advertising." (Uhl Skřivancová, 2014, p. 89). Image visualisation in non-artistic texts has an interdisciplinary overlap.

4 Research methodology

The research was carried out within the project SGS01 / Pdf / 2020 at the Faculty of Education of the University of Ostrava focusing on factors influencing the quality of reading strategies of pupils of secondary technical schools in the Moravian-Silesian Region of the Czech Republic. The research was executed in two phases. In the first stage, it was a quantitatively oriented research through a questionnaire focusing on the image in a non-artistic text as a factor developing the reading strategies of students of secondary technical schools. The research was carried out on a sample of 156 pupils of secondary technical schools aged 15 - 19 years (May - October 2020). The questionnaire contained 43 closed items. This paper includes eight items with their formulation being presented in selected research outputs with their descriptive and statistical processing. The study aims to point out the key statistically verified relationships between variables. The second phase of the research, executed by the semi-structured interview, focused on the identification of factors that influence student teachers at the Faculty of Education of the University of Ostrava when working with non-artistic text, an image in text and their comprehension.

4.1 Selected questions of the questionnaire research from the perspective of pupils

1. What is the relationship between the student's notion of choosing an interactive book (non-artistic text) for reading and the student's use of reading strategy, namely the search for only essential information in the text.
2. What is the relationship between the pupil's notion of preferring books (non-artistic text) with illustrative accompaniment and the pupil's use of reading strategy, namely the search for the context in the text.
3. What is the relationship between the pupil's notion of preferring books (non-artistic text) with illustrative accompaniment and the use of the reading strategy in asking questions when reading the text.
4. What is the relationship between the pupil's priority when choosing a book in terms of the design of its cover and the pupil's decision to purchase the book due to its aesthetic processing.
5. What is the relationship between the pupil's appreciation of the book in terms of non-traditional processing and the pupil's idea of selecting an interactive book (non-artistic text) to read.

4.1.1 Selected hypotheses for the questionnaire research

Hypothesis H1: Pupils who stated that they choose to read the so-called interactive book (as a non-artistic text), search for the essential information more frequently than pupils who answered that they do not select the so-called interactive books.

Hypothesis H2: Pupils who answered that they prefer books (non-artistic text) whose text is accompanied by illustrations, search the text for context more frequently than pupils, who

stated that they do not prefer books whose text is accompanied by illustrations.

Hypothesis H3: Pupils who stated that they prefer books (non-artistic text) whose text is accompanied by illustrations pose questions more frequently while reading the text than pupils who answered that they do not prefer books whose text is accompanied by illustrations.

Hypothesis H4: Pupils who answered that they are influenced by the design of the book cover when selecting a book, bought the book more frequently due to its nice (aesthetic) processing than pupils who stated that they are not affected by the design of the book cover.

Hypothesis H5: Pupils who stated that they appreciate a non-traditional design of books more frequently select so-called interactive books than pupils who answered that they do not appreciate their non-traditional design of books.

4.1.2 Selected results of the questionnaire research and their interpretation

Question B8: Do you select so-called interactive books? (e.g. with an electronic pencil, or books with a task needed to be solved in order to continue)

This item found out (by choosing from two options) whether pupils select so-called interactive books to read. Research results suggest that 127 (81.4%) respondents stated that they do not choose to read the so-called interactive book and 29 (18.6%) respondents stated that they choose to read the so-called interactive book.

Question E2: Do you search only for only essential information in the text and ignore other (non-essential) information?

This item found out (by choosing from two options) whether the pupils search only for only relevant information in the text and whether they ignore other (non-essential) information. Eighty-two (52.6%) respondents stated that they search only for essential information in the text and ignore other (non-essential) information and 74 (47.4%) respondents stated that they do not search only for essential information and pay attention to the other.

Question B3: Do you prefer books with text accompanied by illustrations or photographs?

This item found out (by choosing from two options) whether pupils prefer books with text accompanied by illustrations or photographs. The results confirm that 95 (60.9%) respondents stated that they prefer books with text accompanied by illustrations or photographs and 61 (39.1%) respondents stated that they do not prefer books with text accompanied by illustrations or photographs.

Question E5: Do you search for context throughout reading? (Linking new information with what you already know)

This item found out (by choosing from two options) whether the pupils search for context in the text throughout reading. Research results show that 109 (69.6%) respondents stated they search for the context throughout the reading the text and 47 (30.1%) respondents stated that they do not search for a context throughout reading the text.

Respondents further stated that:

- 91 (58.3%) are not influenced by the cover design when selecting the book. (question B1)
- 128 (82.1%) never bought the book only for its well-made design. (question B2)
- 96 (61.5%) appraise an original design of books. (question B5)
- 112 (71.8%) do not pose auxiliary questions when reading. (question E7)

4.1.3 Results of processing selected hypotheses and their verification

The research did not confirm that:

- pupils who choose to read the so-called interactive book (as a non-artistic text) in the questionnaire survey, search for the essential information more frequently than pupils who do not select the so-called interactive books. (H1)
- pupils who prefer books (non-artistic text) with text accompanied by illustrations pose questions more frequently while reading the text than pupils who do not prefer books with text accompanied by illustrations. (H3)
- pupils who appreciate a non-traditional design of books more frequently select so-called interactive books than pupils who do not appreciate a non-traditional design of books. (H5)

The research confirmed that:

- pupils who prefer books (non-artistic text) with text accompanied by illustrations, search the text for context more frequently than pupils, who do not prefer books with text accompanied by illustrations. (H2)

Tab. 1: Observed and expected frequencies (H2)

Pearson's chi-square = 4.041532 degree of freedom = 1 significance $p=0.0443935$			
Question B3	Question E5 (yes)	Question E5 (no)	Line totals
yes	72 (66.38)	23 (28.62)	95
no	37 (42.62)	24 (18.38)	61
Column totals	109	47	156

Pupils who are influenced by the design of the book cover when selecting a book, bought the book more frequently due to its nice (aesthetic) look than pupils who are not affected by the design of the book cover. (H4)

Tab. 2: Observed and expected frequencies (H4)

Pearson's chi-square = 19.121939 degree of freedom = 1 significance $p=1.22627E-05$			
Question B1	Question B2 (yes)	Question B2 (no)	Line totals
yes	22 (11.67)	43 (53.33)	65
no	6 (16.33)	85 (74.67)	91
Column totals	28	128	156

4.2 Mixed design research survey through semi-structured interviews with pupils of teaching

Eleven students of primary school teacher training at the University of Ostrava in the fields of music education, art education, special education, Czech, pedagogy participated in the second part of the research (a pilot study). The interviews were conducted in October 2020. The interview consisted of a total of 45 items, with 28 being dichotomous and 17 open. Questionnaire items were classified into three categories labelled A, B, C (A: Content of images in non-artistic text, B: Perception of an image in the non-artistic text, C: Learning through illustrated text). The aim of the semi-structured research interviews was to find out:

- what types of reading strategies student teachers use in the learning process when working with non-artistic text,
- the influence of the image in the non-artistic text on the learning (reading) process in the observed sample,
- popularity of teaching resources with different types of images (pictograms, photographs, illustrations),
- what types of illustrations in non-artistic text (teaching resources) student teachers distinguish,

- the importance student teachers attribute to the image in the text as a factor influencing the comprehension of the text.

4.2.1 Selected results of a pilot research survey conducted by a semi-structured interview from the perspective of student teachers and their interpretation

In this paper, we present selected results of the pilot phase of research conducted by semi-structured interviews with student teachers at the University of Ostrava.

The research found that:

- 81.8% of respondents work with non-artistic texts, which include pictograms,
- 100% work with non-artistic texts, which include photographs,
- 81.8% of respondents perceive the importance of photography in the process of understanding the text,
- 63.6% of respondents use books (textbooks, teaching resources) in the learning process, in which decorative writing does not appear.
- 81.8% of respondents do not consider decorative writing as important in the process of understanding a non-artistic text.

The answers to the open question why students perceive the meaning of photography in a non-artistic text as a factor influencing the comprehension of the text were processed by open coding (according to the methodological approach (Švaříček & Šedřová, 2010, p. 211) and classified into three categories:

1. Photographs as a factor contributing to the explanation of written information in a non-artistic text:

- photographs better explain the problem,
- photographs point to essential information and the meaning of the message,
- photographs explain the content of the text,
- photographs convey the content of the text.

2. Photographs as a factor in grasping the broader context of the problem:

- photographs enable to connect an idea with reality,
- photographs link information about the life of, e.g. a composer, with their appearance, behaviour,

3. Photographs as an insignificant factor in understanding a non-artistic text:

- photographs have no meaning in the comprehension of the non-artistic text,
- photographs are not a significant factor in the process of understanding the text.

The answers to the open questions concerning the reasons student teachers like non-artistic texts, which include pictograms, have been processed by open coding and classified into three categories:

1. Pictograms in a non-artistic text as a source of knowledge:

- illustrate the situation described in the text,
- are a source of further knowledge.

2. Pictograms as an essential factor in understanding a non-artistic text:

- the text is more readable and understandable with the help of pictograms,
- pictograms help to comprehend the text,
- Pictograms help to combine text with image and imagination.

3. Pictograms as factors of non-artistic text organisation:

- pictograms help with orientation in non-artistic text,
- pictograms are helpful in the clarity of the text.

5 Discussion

We confirmed the effectiveness of diagnostic tools: a structured questionnaire and a semi-structured interview - by our research surveys of pupils of secondary technical schools and student teachers (who teach or want to teach at secondary technical schools). We also defined the factors that affect the level of reading and visual strategies of both groups of respondents in terms of working with images in the non-artistic text. Questionnaire research confirmed that a non-artistic text, which includes illustrations, can be understood as a factor that activates students' critical thinking and reading strategies towards finding a context in the text. Image visualisations (e.g. illustrations, concept maps) in the non-artistic text are an influential factor influencing the comprehension of the text. The research did not confirm that students, who can appreciate non-traditionally processed non-artistic texts, prefer to read and learn interactive books, which at the same time do not encourage students to ask questions and search for essential information to understand the text. The results of interviews with student teachers interested in teaching at secondary technical schools confirmed that working with images (photographs, pictograms, illustrations) is one of the significant factors developing pupils' reading strategies. Decorative writing in the non-artistic text is more frequently perceived as a barrier (negative factor) in understanding the information read.

6 Conclusions (1st and 2nd phases of research)

6.1 Conclusions from the 1st phase of quantitatively oriented research

The research was carried out by means of a questionnaire from the perspective of pupils of secondary technical colleges in the Moravian-Silesian Region of the Czech Republic.

Selected research results confirmed that:

- pupils more frequently prefer books for reading (learning), with the text accompanied by illustrations; in the course of reading they search for context. (H2)
- pupils who are influenced by the design of the book cover when choosing a book buy the book more frequently due to its nice (aesthetic) design. (H4)

The research did not confirm that:

- selecting a so-called interactive book encourages pupils to search for essential information in the text more frequently. (H1)
- choosing a book (non-artistic text) with illustrations encourages students to ask questions more frequently. (H3)
- the appreciation of non-traditional design of the book by pupils is the reason for more frequent selection of the so-called interactive book for reading or learning (H5)

6.2 Conclusions from the 2nd phase of research (pilotage)

The research was carried out through a semi-structured interview with student teachers at the University of Ostrava (who already teach at secondary technical schools or desire to teach at this type of school in the future). The results of both research surveys demonstrated the need for current education with an emphasis on educating the reader, who can interpret images reflecting the multifaceted nature of the text and with an appeal to a functional understanding of the text.

The pilot research, through a semi-structured interview from the perspective of student teachers, showed that selected factors

influencing the comprehension of a non-artistic text can be considered:

- photography as a factor contributing to the explanation of written information,
- pictograms as an important factor in understanding a non-artistic text,
- pictograms as factors of organisation of the non-artistic text,
- the importance of decorative writing in the non-artistic text as a factor of clarity.

The research confirmed that most respondents:

- work with non-artistic texts, which include photographs,
- perceive the importance of photography in the process of understanding a non-artistic text,
- do not see the importance of decorative writing in the process of understanding non-artistic text.
- work with non-artistic texts, which include pictograms.

Developing reading and visual literacy is a lifelong need and a right of every human being. The reader and visually literate individual will successfully succeed in the labour market, as they are the bearer of mature receptivity and functional critical thinking. In the educational environment, emphasis must be placed on educating the reader, who can interpret images that reflect the multifaceted nature of not only artistic but also non-artistic text in a variety of teaching (e) sources and paper texts.

Literature:

1. Daňková, V. (2012). *Uplatnění principu názornosti při přípravě učebního textu z psychologie* (Bakalářská práce). Zlín: Univerzita Tomáše Bati ve Zlíně, fakulta Humanitních studií. [Daňková, V. (2012). *Application of the principle of illustration in the preparation of a psychology textbook* (Bachelor's thesis). Zlín: Tomas Bata University in Zlín, Faculty of Humanities]
2. Dondis, D. A. (1984). *A primer of visual literacy*. 7. Vyd. New York, London: The MIT Press Cambridge.
3. Fleming, M. L. (1987). Designing Pictorial/Verbal Instruction: Some Speculative Extensions from Research to Practice. In Houghton H.A., Willows D.M. (eds). *The Psychology of Illustration*. Springer, New York, Vol. 1, 136-157. https://doi.org/10.1007/978-1-4612-4706-7_5.
4. Flood, J., Heath, S. B. & Lapp, D. (2008). *Thoughts on Visual Literacy*. In: Handbook of Research on Teaching Literacy through the Communicative and Visual Arts. New York: Taylor and Francis Group.
5. Fulková, M. (2002). Když se řekne ...vizuální gramotnost. *Výtvarná výchova*, 42(4). ISSN 1210-3691. [Fulková, M. (2002). When it is said... visual literacy. *Art Education*, 42 (4). ISSN 1210-3691.]
6. Jacobson, R. & Pomorska, K. (1993). *Dialogy*. Praha: Český spisovatel, 68. [Jacobson, R. & Pomorska, K. (1993). *Dialogues*. Prague: Czech Writer, 68]
7. Klimeš, J. (2015). *Hledání významu v umělecké narativní ilustraci*. Brno: Masarykova univerzita, Filozofická fakulta. [Klimeš, J. (2015). *Searching for meaning in artistic narrative illustration*. Brno: Masaryk University, Faculty of Arts.]
8. Linhart, J. (1982). *Základy psychologie učení*. Praha: SPN. [Linhart, J. (1982). *Introduction to psychology of learning*. Praha: SPN.]
9. Mailaret, G. (1975). Zvuk a obraz jako nositelé informací ve výuce. In *Modernizace metod výchovně-vzdělávací práce a moderní didaktická technika*. Praha: SPN, 93-105. [Mailaret, G. (1975). Sound and image as carriers of information in teaching. In *Modernisation of methods of educational work and modern didactic technique*. Prague: SPN, 93-105]
10. Maňák, J. & Švec, V. (2003). *Výukové metody*. Brno: Paido. ISBN 80-7315-039-5. [Maňák, J. & Švec, V. (2003). *Teaching methods*. Brno: Paido. ISBN 80-7315-039-5.]
11. Mareš, J. (1995). Učení z obrazového materiálu. *Pedagogika*, 45(4), 318-327. [Mareš, J. (1995). Learning from pictorial material. *Pedagogiy*, 45 (4), 318-327.]
12. McLean-Thorne, D. R. (1994). Specific learning difficulties: An alternative perspective? *School Psychology International*, 15(1), 69-88. <https://doi.org/10.1177/0143034394151005>.
13. Molnár, J. & Tláškal, J. (2012). Prostorová představivost nejen v matematice. *Linguistica online*. Available: <http://www.phil.muni.cz/linguistica/art/molnar-tlaskal/mot-001.pdf>
14. [Molnár, J. & Tláškal, J. (2012). Spatial imagination not only in mathematics. *Linguistica online*. Available: <http://www.phil.muni.cz/linguistica/art/molnar-tlaskal/mot-001.pdf>]
15. Park, Jie Y. (2012). A different kind of reading instruction: Using visualizing to bridge reading comprehension and critical literacy. *Journal of Adolescent & Adult Literacy*, 55(7), 629-640.
16. Peterson, M. O. (2016). Schemes for integrating text and image in the science textbook: Effects on comprehension and situational interest. *International Journal of Environmental & Science Education*, 11(6), 1365-1385.
17. Rankin, R. O. (1989). The development of an illustration design model. *Educational Technology Research and Development*, 37(2), 25-46.
18. Sternberg, R. J. (2009). *Kognitivní psychologie*. Praha: Portál, 640. [Sternberg, R.J. (2009). *Cognitive psychology*. Prague: Portal, 640.]
19. Trahorsch, P., Bláha, J. D. & Janko, T. (2018). Analýza výzkumů vizuální v učebnicích na příkladu učebnic s geografickým obsahem. *Pedagogická orientace*, 28(1), 111-134. [Trahorsch, P., Blaha, J.D. & Janko, T. (2018). Analysis of visual research in textbooks on the example of textbooks with geographical content. *Pedagogical Orientation*, 28 (1), 111-134.]
20. Uhl Skřivanová, V., et al. (2014). *Pedagogika umění – umění pedagogiky, aneb, přínos oboru výtvarná výchova ke všeobecnému vzdělávání*. Ústí nad Labem: Univerzita Jana Evangelisty Purkyně. [Uhl Skřivanova, V., et al. (2014). *Pedagogy of art - art of pedagogy, or, the contribution of the field of art education to general education*. Ústí nad Labem: Jan Evangelista Purkyně University.]

Primary Paper Section: A

Secondary Paper Section: AM

IMPACT OF BREXIT ON RETURN MIGRATION TO THE SLOVAK REPUBLIC

^aSERGEJ VOJTOVIČ, ^bNATÁLIA LETKOVÁ, ^cJÚLIA KOSTROVÁ

*Department of Management and Human Resource Development,
Faculty of Social and economic relations, University of
Alexander Dubček in Trenčín, Študentská 3, 911 50 Trenčín,
Slovakia*

*email: ^asergej.vojtovic@tmuni.sk, ^bn.letkova@hotmail.sk,
^cjulia.kostrova@tmuni.sk*

This publication was created within the frame of the project funded by "Setting up personnel management processes in hospitals and its impact on the migration of doctors and nurses to work abroad", APVV-19-0579.

Abstract: Brexit is one of the most important events of the present time, which affects several areas of social life in the United Kingdom, as well as in the countries of the European Union and around the world. Obviously, this event is of interest to the academic and professional public. This study focuses on the impact of Brexit on migrant worker flows in the UK and examines the impact of Brexit on the return migration of Slovak citizens working in the UK. The findings of the first studies on this issue have already indicated an expected increase in the trend of migrant workers returning back to their home countries, which should be reflected in their migration balances (especially return migration) as well as in the transfer of migrant workers to other EU Member States.

Keywords: Brexit, labour migration, return migration, return migration motives.

1 Introduction

As a major social event, Brexit began to resonate in professional and public discussions and has been the subject of scientific research since 2015. The focus of these studies varies from political, legal, economic, social or cross-border cooperation. The overall balance of the impact and losses from labour migration for the United Kingdom in the case of changes in its intensity and magnitude under the influence of Brexit cannot yet be accurately calculated. Changes in the migration decisions of Slovak citizens working in the United Kingdom will form only a small part of this migration mosaic for the United Kingdom. However, from the perspective of Slovakia's interests, its emigrants in the United Kingdom create one of the most significant part of the total number of Slovak migrants working abroad.

In this context, it is necessary to know what Brexit means for the Slovak labour market and for citizens who are employed in the United Kingdom and how the employment situation will change when the migrants return home. After returning home, will Slovak citizens be able find employment and will they be willing to work under conditions which, even 15 years after joining the EU, remain different than in the United Kingdom?

It is known that leaving of Slovak citizens to work in the United Kingdom began after the Slovak Republic joined the European Union in 2004 and was intensified by the subsequent accession of the country to the Schengen area. At that time, the employment situation in Slovakia was very difficult. Unemployment was close to 20%, which was more than half a million of unemployed people in absolute terms. Despite the inflow of foreign investment into the Slovak economy, unemployment remained at almost the same level. Under these conditions, a certain proportion of emigrants sought employment abroad, others were looking for better conditions and remuneration for work, or other social benefits.

At that time, employment in the United Kingdom became attractive to Slovak citizens mainly because of their knowledge of the English language, which has been in Slovakia compulsory subject in elementary schools. Apart from the absence of language barrier, another reason was the UK's approach to new EU members during its enlargement and the decision not to use a transitional period for immigrants from newly admitted EU countries. The countries of the original EU-15 had the possibility to use the transitional period in order not to allow the citizens of the newly admitted countries to look for work in their labour markets, or to allow only selectively in certain jobs. The United

Kingdom (together with Ireland and Sweden) did not take advantage of this transition period or the possibility of managed selective migration, which made the United Kingdom in particular an attractive destination for Slovaks intending to work abroad (Tupá, Vojtovič, 2018). Since Slovakia joined the EU in May 2004 until the end of 2006, up to 56,425 Slovak citizens have been employed in the UK labour market under the „Worker Registration Scheme“, representing 10.2% of the total migrants for work from the new EU Member States in that period (Divinský, 2007).

If the development of these events was different, evidently the army of unemployed people would have been registered with labour offices for years, competing with poverty, losing work skills and willingness to work, and burdening the welfare system. In the present case, emigrants employed abroad have at least maintained their social and economic status and, at the same time, through remittances have supported an increase in aggregate demand in the Slovak economy. The decision of Slovak workers to work in the UK after Slovakia joined the EU was favourable for both Slovakia and the United Kingdom. At present, when the unemployment rate in Slovakia is around 6% and domestic employers experience a shortage of skilled workers, the return of Slovak emigrants from the United Kingdom would be beneficial for domestic employers and the Slovak economy. It is understandable that the community of Slovak migrants in relation to the UK population is not a significant component. However, in relation to the total population of Slovakia and in particular in relation to the number of Slovak migrants abroad, it is relevant and represents a qualitative problem with regard to „brain drain“, significant negative migration balance in individual sectors such as health care, information technologies and also with regard to reduction of the reproductive potential of Slovak population. In case of return of Slovak emigrants back to Slovakia, the current problem of shortage of qualified workers in industrial production or health care could be solved to a certain extent. At the same time, it should be stressed that intensive return migration would clearly not be beneficial for the United Kingdom. How this problem will be solved will depend on the UK's new immigration policy as well as on the decisions of emigrants - whether they choose to remain in the UK, re-migrate to other EU countries, or return to their home countries after Brexit is completed.

2 Theoretical Background

For several years, the planned exit of the United Kingdom from the EU has attracted attention of the general public, experts and, also scientists who have addressed its impact on various areas of social life. Most often, researchers are investigating Brexit not only in the context of its impact on a particular area of social life, but also in the context of a particular country or group of countries that are influenced by Brexit - what the country gains versus what it loses after Brexit is done. Of course, this event will also have a significant impact on the UK itself. Therefore, the largest representation among scientific studies are those that deal with the effects of Brexit on the UK (Dhingra, 2019; Tupá, 2017) or deal with the genesis of the causes and consequences of this event (Wincott et al., 2017; Siles-Brügge, 2019).

The impact of Brexit on the economic development of the United Kingdom, especially at local level, is presented in scientific studies in two different scenarios, soft and hard, developed from a structural business model. The effect of Brexit in both scenarios is expected to be negative (Dhingra et al., 2019). At the same time, it is emphasized that Brexit provides an opportunity to put an end to forms of the local neoliberalized economy and to focus on innovative trends (Kordoš, Krajiňáková, 2018), family business (Srovnalíková et al., 2018), community development based on the assets of different economies, corporate social responsibility (Krajiňáková et al., 2018) and approaches to a solidarity economy (North, 2017).

In several studies, Brexit is seen as one aspect of the wider crisis of neoliberalism, as part of a wider development of global capitalism, and as a new form of organized capitalism with a national focus, which was reflected in the elections of Donald Trump in the USA and the erosion of global liberal institutions (Nölke, 2017; Mulvey, Davidson, 2018). The „crisis of solidarity“, which is one of the fundamental values of the European Union, is also considered to be part of this neoliberal crisis. Comprehensively, Brexit is perceived as testing of solidarity at local, national and European level. As the authors of one study point out, those who voted in favour of the United Kingdom's exit from the European Union have revealed the British dimension of this „solidarity crisis“ (Baglioni et al., 2019). At the same time, Brexit, according to another study, influences the basic characteristics of the world outside the UK. As the study emphasizes, Brexit acts as a promise of a different future, as a framework for shaping national and European identity in different national environments, as a model of understanding geopolitical reality and the nature of the global economic order (Adler-Nissen, 2017).

Based on this, Brexit could be seen as a response to these global transformations as well as a way of addressing the three global dilemmas (Wincott, 2017). The first, according to D. Wincott, is to control immigration, gain lost sovereignty or access the European Union's markets. The second dilemma stems from the need to maintain economic prosperity in the case of post-Brexit immigration restrictions, and the third is linked to the weakening of parliamentary democracy by remaining in the single market. However, the problems mentioned above, and their analysis are the global environment in which Brexit is implemented and which we consider to be a commentary on the Brexit-related context. As a shift towards the main problem can be considered an examination of the impact of Brexit on labour rights in general and on the participation of British trade unions in European Works Councils. (Gumbrell-McCormick, Hyman, 2017). Since the period between 1975 and 2016 as a modern era of neoliberalism in his British manifestation and his particular policies during those years influenced migration to the United Kingdom, the issue of migration and the challenges of immigration policy dominated the whole debate between the two UK referendums on membership in the European Community (Mulvey, Davidson, 2018; Rolfe, 2019). Even the Brexit vote was considered a vote against the free movement of workers and new policies should aim at introducing more restrictive controls (Barnard, 2016; Parker, 2017).

Findings of surveys indicate that specific increases in local immigration and moods about immigration control were key predictors of the Brexit vote and the percentage of migrants who arrived between 2004 and 2011 positively correlated with the share of votes for Britain's exit from the European Union (Tammes, 2017).

The key to understanding Brexit according to Antonucci, Varriale (2019) are inequalities between peripherals within Europe and inequalities in migration opportunities within the EU. Based on the post-Bourdieuian social theory, these authors explore the role of the UK in legitimizing the fundamental and peripheral inequalities in Europe and the social hierarchies between the western and eastern, northern and southern European populations. At the same time, the authors emphasize the UK's influence on EU transnational policies, which shape the rules and importance of intra-European migration and how the UK has contributed to the unequal Europe it wants to leave and how unequal migration of EU citizens makes Brexit an asymmetric process.

The genesis of the reasons and causes of Brexit is now a historical issue. Finding answers to questions about the impact of Brexit on the United Kingdom itself and other countries remains current in the professional community and scientific studies (Vousden, 2019). What are the short and long-term effects of the referendum on migration, will the UK maintain an ethical approach in migration policy and a strong preference for EU

citizens, and to what extent will migration policy shift towards a liberal or restrictive direction (Harrison, 2019; Portes, 2016).

It is known that not only in public opinion exists a negative thinking and perception of labour migrants and UK immigration policy (Kaufmann, 2017; Lumsden et al., 2018; Walter, 2019). Negative attitudes to migration also occur at institutional level. For example, the Migration Advisory Committee in its report from September 2018 recommended a new regulation for low-skilled immigrants after Brexit, which was then adopted by the Home Affairs Committee in its White Paper (MAC, 2018). This White Paper raises public concerns that labour immigrants are reducing the labour market opportunities of British workers and undermining already negotiated principles of their salaries and working conditions (Rolfe et al., 2018).

Nevertheless, it is evident that not only industrial, but also service, transport and other sectors of the country's economy are currently unable to function without working immigrants. As stated in a study by Rolfe, Runge, Hudson-Sharp (2019), employers say they must continue to recruit low and high-skilled workers from abroad, because the supply of British workers is insufficient. Therefore, alternative models of employing immigrant workers are being sought, such as employer sponsorship. According to the proposals of UK government, highly qualified jobs will also require foreign workers to be employed after Brexit, and these should be sponsored by employers. Other institutional conditions for future immigration policy are also being created in this spirit. One such document, the Conservative Manifesto, prepared in accordance with the Australian-style points-based system, states that priority will be given to „people who have a good knowledge of English, are lawful and have a good education and qualification“ (Cavendish, 2020).

Low-skilled foreign workers and low-paid workers will receive short-term work permit that will not require employer sponsorship (Sumption, 2019). This model of employing immigrants, according to Sumption, gives the government greater control over which jobs can be filled by immigrants and gives employers more power over their workers, but obviously increases the administrative burden of hiring foreign workers. One of the few studies that focuses on working immigrants in the UK examines the attitudes of Polish, Romanian and British workers to low-skilled migration to the EU in the context of a new skills-based immigration system. This system, which was at the centre of Brexit's political discussions, favours highly qualified foreign workers (Bulat, 2019). In this context, the subject of the study was the perception of the term 'low-skilled labour immigrants' by workers, and why low-skilled jobs that could be occupied by unemployed people in the UK are dominated by labour immigrants. The British lack of interest in working in some jobs and in particular low-skilled jobs (see Rolfe et al., 2018, p.38) is based on their assumption that immigrants are unfairly favoured by providing them with subsidized accommodation and food. Therefore, immigrants can afford to receive lower wages, unlike the British, who would „prefer to be unemployed“ in these circumstances (Bulat, 2019, p.54).

Research on the migration of EU citizens to work in the UK in qualitative terms after 2004 focused mainly on Polish workers as the largest group of migrants (Anderson, 2017), Polish and Lithuanian (Parutis, 2011) or Polish and Romanian as the second largest group (Bulat, 2019). Polish migration literature itself focuses mainly on highly qualified emigrants with higher education (Bilan, 2014; White, 2016). In their research, several authors followed the work trajectories of re-migrants after returning to their home country and the possibilities of their employment (Bermudez, López, 2019; Duci et al., 2019). In these cases, return migration was a natural process. In our case, return migration will be linked to Brexit, which means it will be caused by urgent changes in the rules and conditions of employment of migrants in the UK. It is understandable that the current scientific concern is primarily the institutional aspects of labour migration and the interests of the state in the post-Brexit

period, which create the legal framework and conditions for immigrants to remain in the UK or to return home or to re-migrate. British moods and attitudes to labour migrants and immigration, which are a very important factor affecting immigrants' attitudes, motives and final decisions, also occur in scientific studies. (Rolfe et al., 2018, p.38; Bulat, 2019, p.54). Although British citizens' attitudes to migration have moderated since the vote on Brexit, the vast majority still require limited immigration. However, the analysis of the UK labour market situation after Brexit, the mood, the assessment and the response to the forthcoming conditions of employment of immigrants in the form of return migration are not yet of interest to professional and scientific studies in both the UK and immigrant countries of origin. As already mentioned, one of Brexit's main issues was migration and immigration policy, which will clearly affect the current and future migratory flows of workers to the UK, and in particular how it will be perceived and evaluated by immigrants who already live and work in the UK. At the same time, this will affect return migration and possibly re-migration to some extent. It is understandable that for professional and scientific community in the UK return migration is not the focus of their interest. At the same time, we did not meet relevant studies on return migration in the countries of origin of immigrants working in the UK. Therefore, in this study we are interested in how the events related to Brexit affect the mood of Slovak citizens, their assessment of the institutional aspects of the UK's new migration policy, the expected economic and social conditions of work, the attitudes of British citizens and so on.

Of course, the new conditions and rules of labour migration regulation after Brexit will not automatically affect the decisions of Slovak citizens to return home. Those who do not like the new rules of migration policy after Brexit and the conditions of work and life may not return home. With the experience and skills gained in the UK, they will have a chance to find employment in other Western European countries.

3 Methodology and Data

The aim of the study is to determine the impact of Brexit on the motives and expected extent of return migration or re-emigration of Slovak nationals who have worked in the UK labour market. Of course, irrespective of the Brexit campaign, some of the immigrants who worked in the UK had their thoughts and motives to return home. Brexit could only strengthen the motives and projected return migration plans for most immigrants who arrived in the United Kingdom, mainly from the European Union. We examined the motives of return migration and the evaluation of its expected extent at the time of the final phase of Brexit, i.e. at the de facto stage. Therefore, the motives and projected extent of return migration consist of two parts - the motives and projected extent of return migration that were formed over time into the Brexit campaign and those aspects that were influenced by both the Brexit campaign and Brexit itself.

The difficulty in measuring the extent of return migration is the difficulty of tracking it. One possibility is to monitor the number of registered persons for the payment of health insurance in Slovakia. This method was used, for example, by the authors of the Institute of Financial Policy of the Slovak Republic (IFP), who in their study found, among other things, that approximately 28,000 Slovak immigrants returned to the Slovak Republic annually from 2010 to 2015. In 2016, their number was higher by 14%, which represented more than 32 thousand (Rizman, Sacherová, 2018).

In another study, the authors of IFP, using the same methods and data sources, report that over the past 15 years, Slovakia has lost more than 300,000 workers due to emigration, which represents approximately 12% of the working population (Haluš et al., 2017). Furthermore, this study states that almost half of those who left between 2000 and 2012 returned to 2015. Although the authors consider the chosen method to be the most reliable, it is necessary to realize that many emigrants working abroad do not opt out of health insurance in the Slovak Republic and continue

to pay for it voluntarily. We assume that this will be eliminated by the exit of the United Kingdom from the EU making Slovakia a third country, so citizens of Slovakia who will continue to work in the UK will no longer be able to use European insurance and in this case the indicators of migrant flows of workers will become more accurate. Another drawback of this method is that it is impossible to define from which country the citizens of Slovakia return home. Therefore, we consider the named method irrelevant for the purposes of our research.

One method of monitoring migration is the analysis of statistical data provided by the Statistical Office of the Slovak Republic. Approximately every ten years, the Statistical Office carries out a population census and subsequently annually carries out sample surveys on the state and population movements. Migration statistics are based on evidence of change of permanent residence and provide data on the extent of internal and external migration and the characteristics of migrants. But even this method does not provide completely accurate information on labour migration. As the population rarely changes their permanent residence due to administrative demands and failure to fulfil this obligation is not penalized, therefore these statistics do not provide adequate data on the size of migratory flows of workers. However, a positive aspect of this method is that it provides data on the characteristics of migrants - not only their age or gender, but also their education, profession and the destination country of migration. Some information on migrant flows of workers abroad and back is provided by the Statistical Office of the Slovak Republic, which conducts a labour force sample survey on a sample of 10,250 households on a quarterly basis. However, these findings mainly target people who work abroad for less than one year. For example, if someone has been working in the United Kingdom for two years, they are not registered in these migration statistics. The emphasis on short-term migration means that this statistic will mainly capture the increased interest in personal care jobs in Austria or seasonal work in Germany (Tupá, 2017).

An idea of the number of Slovak citizens migrating to and from abroad can also be obtained using various statistics, which are produced in the target countries on the basis of matrices, population censuses, sample surveys at the border, national social insurance data, etc. However, even in this way we will not get a comprehensive overview of the motives and extent of migrant workers' flows abroad as well as return migration. In order to determine the impact of Brexit on the motives and expected extent of return migration or re-emigration of Slovak citizens, we conducted an empirical survey whose task was to define the motives and expected extent of return migration of citizens of Slovakia affected by Brexit. The subject of our research were motives and projected plans to return home of Slovak emigrants, which we obtained from their statements. For this purpose, we used a questionnaire, which was distributed online in May 2019 to Slovak emigrants who lived and worked in the United Kingdom at that time. We contacted relevant websites and social network discussion groups focusing on Slovak emigrants with a request to distribute the questionnaire to members of these groups and visitors of the sites. The Slovak Embassy in the United Kingdom was also contacted with the same request. As a result of the chosen procedure we obtained 468 completed questionnaires, which were subsequently processed and evaluated for the purposes of our study. Regarding the representativeness of the empirical survey, we did not have an accurate indicator of the size of the population as well as its socio-demographic characteristics. It is estimated that around 10,000 Slovak citizens work in the United Kingdom (Grmanová, 2018). However, according to the socio-demographic characteristics found in several studies, our respondents do not differ significantly from other Slovak immigrants working in EU countries (Divinský, 2007; Masso et al., 2019). This allows us to find out the motives of return migration and its intensity under the influence of Brexit of individual socio-demographic groups of Slovak immigrants. An exception in our sample is the structure of respondents by gender, dominated by women, which can be explained by the

greater activity and willingness of women to complete the questionnaire compared to men.

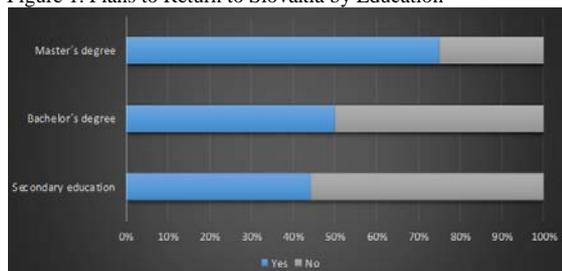
For testing the independence between variables of our sample we used Pearson Chi-square independence test. In accordance with the recommended procedure for calculating Pearson Chi-square independence test, a contingency table was used, all requirements were met - measurements were independent, variables were categorical and at least 80% of the expected frequencies corresponded to ≥ 5 . In this case, the null hypothesis stated that the variables are independent. We set the significance level at $\alpha = 0.05$. We also used the Cramér's V coefficient used for measuring the association between a dichotomous variable and a variable that takes more than two categories, or for measuring the relationship between two nominal variables having two or more levels. The result of the calculation of the Cramér's V coefficient takes values from 0 - which means the absence of association between the variables up to 1 - complete association.

Among the respondents who completed our online questionnaire, 29.5% were men and 70.5% were women. In the questionnaire, we divided the age of respondents into five categories, of which two were not represented at all, namely the category 45-54 years and the category over 55 years. The 15-24 age group was represented by 15% of the respondents, the 25-34 age category represented more than 45% and the 35-44 age category represented almost 40% of the respondents. Secondary education (63%) prevailed significantly in the respondents, which corresponds to the available statistics on the population of Slovaks living in the United Kingdom (Tupá, Vojtovič, 2018; Masso et al., 2019). None of the respondents had primary education and none had doctoral degree. 15% of respondents had a bachelor's degree and 21% had a master's degree. The family status of our respondents was characterized by a predominance of single people - 65%. The rest of the respondents were married. We also examined their length of residence and working status in the United Kingdom. The results showed that none of the respondents had lived in the UK for less than 3 months, 12% reported a 4-12 month residence, 7% more than a year, and 81% had lived in the UK for more than two years. Student status was reported by 8%, employee status 66%, unemployed less than 15% and self-employed almost 11%.

4 Results and Discussion

In the questionnaire survey we examined whether Brexit-related events affect respondents' decisions to return to Slovakia or re-emigrate to other EU countries. We were also interested in whether the citizens of Slovakia who work in the United Kingdom are following the economic and social situation in Slovakia and from where they draw information for such purposes, and similarly, whether they are following the Brexit situation and from what sources they draw information. Subsequently, we asked respondents to assess, based on the information gathered about Brexit, how they perceived the threat to their working status and the negative impact on their plans to continue working in the United Kingdom. Respondents who stated their intention to return to Slovakia were asked about their motives, and the suggested answers included the threat of Brexit as one of several possible motives for return or re-emigration.

Figure 1. Plans to Return to Slovakia by Education



Source: author survey

When asked whether respondents are planning to return to Slovakia, 53% said they were not planning, 47% said they were planning to return. The answers to this question differed depending on the level of education of the respondents. 44% of respondents with secondary education, 50% of respondents with bachelor's degree and 75% of respondents with master's degree stated they were planning to return to Slovakia (Figure 1).

In relation to the same question, we have further set the assumption that respondents who have lived in the UK for a longer period of time will more likely plan to stay in the UK and not return to Slovakia. We tested this assumption by Chi-square independence test and then quantified the observed dependence using the Cramér's V coefficient.

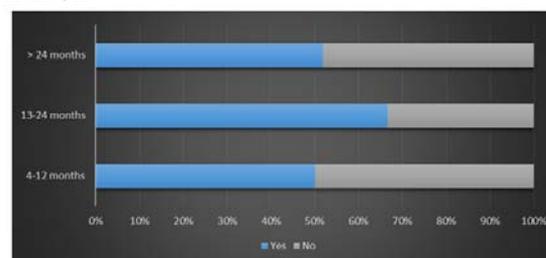
Based on the answers to the question whether the respondents plan to return to Slovakia, we have identified and formulated two hypotheses:

H0: There is no statistically significant dependence between the length of residence of respondents in the UK and the intention to return to Slovakia.

H1: There is a statistically significant dependence between the length of residence of respondents in the UK and the intention to return to Slovakia.

The criteria for using Chi-square test ($e_{ij} > 5$; $N \geq 20$) were met and the result of Chi-square independence test with $P = 0.74$ and a critical value = 5.99 at the selected level of significance $\alpha = 0.05$ does not allow us to reject the null hypothesis, which means that there may be a relation between the length of residence in the UK and the chosen answer but the calculation of the Cramér's V coefficient with result 0.068 at two degrees of freedom indicates a weak dependence between the named variables. This means that our assumption has not been confirmed and there was no statistically significant dependence between the length of residence of respondents in the UK and their intention to return to Slovakia. The results are supplemented by a graphical representation of the answers to the question of planned return to Slovakia according to the length of residence in the UK (Figure 2).

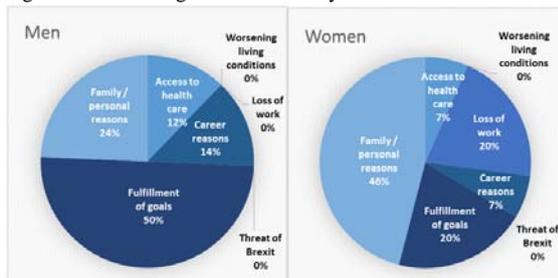
Figure 2. Plans to Return to Slovakia by the Length of Residence in the UK



Source: author survey.

When asked about the motives of return migration, the respondents could choose several answers according to what is important to them. In this context, it is necessary to stress that our question sounded neutral without emphasizing or commemorating Brexit events. The question of Brexit's impact on return migration motives was included later in the questionnaire. However, it cannot be ruled out that in answering this question in the semantic field of respondents, the reality associated with Brexit may have emerged. We were interested in the differences in the responses of men and women (Figure 3).

Figure 3. Return Migration Motives by Gender



Source: author survey.

The results of our survey indicate that family / personal reasons would predominate among the assumed motives for returning to Slovakia, and as another motive in order of importance, respondents chose fulfilment of goals that were set before leaving for the United Kingdom. These motives were equally acceptable by both men and women. As the third motive for return migration, in order of importance, men cited career reasons, while for women it would be a loss of work in the United Kingdom. Surprisingly, none of the respondents identified the threat of Brexit as a motive to return to Slovakia, even though this question seemed irrelevant in the Brexit research questionnaire. Likewise, the 'worsening of living conditions in the United Kingdom' option has not been identified as a motive for return by any respondent. The male population of our respondents, without exception, monitors the situation and is interested in events taking place in Slovakia. In contrast, only 60% of women showed activities related to searching for information on the current situation in Slovakia. The rest of the female population said they were not following the situation in Slovakia. Concerning the sources used to search for information on the situation in Slovakia, respondents named media as a priority, followed by social networks and family members/ friends on the third place in order of importance. The answers of men and women to this question did not differ significantly, the order of importance of the named resources was identical.

In answers to the question of whether respondents are following the Brexit situation, only 12% of them answered 'no, I don't care', 54% said they were following the situation, drawing information from the media. Another 32% of respondents also responded positively to this question, with the difference that they draw information from social networks. Two percent of respondents receive information about Brexit from family members or friends.

Relevant for the purposes of our study were the answers to the question of Slovak immigrants in the United Kingdom, as they perceive the impact of Brexit on their plans to remain in the United Kingdom or return home. We assumed that respondents with lower education would consider Brexit to be a greater threat to their work in the United Kingdom as their fellow citizens with higher education. We also subjected this assumption to a Chi-square independence test to verify the statistical relationship between respondents' level of education and the perception of Brexit's impact on their ability to remain in the UK. We then quantified the observed dependence by Cramér's V.

Based on the responses of our respondents to how they perceive Brexit's impact on their plans to remain in the United Kingdom, we have formulated two hypotheses:

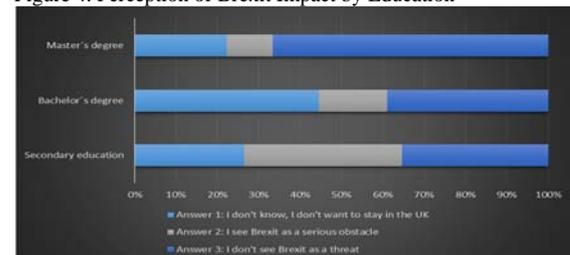
H0: There is no statistically significant dependence between respondents' education and perception of Brexit's impact on the possibility of continuing to work in the UK.

H1: There is a statistically significant correlation between the education of respondents and their perception of the impact of Brexit on the possibility of staying in the UK.

The requirements for using the Chi-square independence test ($e_{ij} > 5$; $N \geq 20$) were met and result $P = 16.23$ with a critical

value of 9.48 at the selected significance level $\alpha = 0.05$ does not allow us to accept a null hypothesis about independence of these variables. The results of the independence test calculation clearly indicate that there is a statistically significant association between the level of education of respondents and their perception of the impact of Brexit on the possibility of employment in the United Kingdom. At the same time, the calculated value of the Cramér's V coefficient of 0.228 at the four degrees of freedom indicates a strong dependence between the named variables. Even more relevant would be indicators of dependence of these variables if we calculated them on the basis of only two educational categories of respondents - secondary and university education. The results of testing the dependence between the level of education of respondents and their perception of the impact of Brexit on the possibility of staying and working in the United Kingdom are shown in Figure 4.

Figure 4. Perception of Brexit Impact by Education



Source: author survey.

Based on our empirical survey, Brexit clearly will affect the persistence and work in the United Kingdom of almost half of Slovakia's migrants and will trigger a significant degree of forced return migration. This will be more relevant to migrants with secondary education, of which 38% consider Brexit a threat to staying and working in the United Kingdom. A minor threat to staying and working in the United Kingdom is Brexit for migrants with university education. Brexit is seen as a serious obstacle to staying in the United Kingdom by only 17% of migrants with a bachelor's degree and 11% with a master's degree.

Cultures across the world are becoming more and more interconnected and the business world is becoming increasingly global. The implication for corporations involved in international trade and cross-border mergers and acquisitions is that they are facing increasingly global employees, customers, suppliers, competitors and creditors (House et al., 2004).

5 Conclusions

The theoretical analysis of the current state of knowledge of labour migration in relation to Brexit has already indicated that this event will have an impact on the overall state and trends in migrant workers' flows in the United Kingdom, while also generating a significant return migration to home countries. This will fully apply to emigrants from third countries, as emigrants from the Eastern European countries of the EU have an alternative to re-migrate to other countries of the European Union. Regardless of the events associated with Brexit, more than half of Slovak immigrants are planning to return to Slovakia in the uncertain future. The predicted motives for these decisions are primarily family or personal reasons. Other motives in order of importance are the fulfilment of goals that were set before leaving for the United Kingdom and career reasons for men and the loss of work in the United Kingdom for women. Brexit is seen as a barrier to staying in the United Kingdom and a motive for return migration by almost a third of our respondents. However, depending on qualifications and education, the perception of Brexit as an obstacle to working in the UK varies considerably. While nearly 40% of immigrants with secondary education sees Brexit as a barrier to staying and working in the United Kingdom, only 11% immigrants with a master's degree share this view. This data suggests that addressed emigrants seem to have experience in finding work and employment in the United Kingdom or other developed EU countries where

education and qualifications have guaranteed success in finding work and employment. At the same time, these people seemed to be well informed about all events related to Brexit, starting with public debates, through a referendum and ending with the conditions for negotiating the end of EU membership, where the issue of immigration policy was dominant. As we have already mentioned, one of the sketches of the new immigration policy will be to give preference to highly qualified migrants and to apply stricter measures to low-skilled workers. This suggests that Brexit will not substantially affect the intensity and extent of labour migration of the European Community. The return migration caused by Brexit will mainly concern low-skilled workers from Eastern European countries. However, this category of immigrants makes up two thirds of the total number of Slovak immigrants. Nevertheless, the return migration of Slovak workers will not affect the overall situation on the UK labour market after Brexit. But if we assume that the qualification structure of immigrants from other Eastern European countries and especially from Poland is similar, in the United Kingdom this category of immigrants counts not tens but hundreds of thousands. In this case, the return migration wave can be very intense and extensive and will involve hundreds of thousands of people. In the case of Slovakia and other Eastern European countries, this may have a positive impact on national labour markets if some of the immigrants return home. At the same time, the labour markets of other developed EU countries, where these people will be able to re-migrate, will make use of this job potential without major problems. On this basis, it can be assumed that the return migration wave triggered by Brexit may cause some problems in the UK labour market, particularly in the low-skilled segment. This means that the UK labour market will experience an acute shortage of vacant workers, putting pressure on low-skilled domestic workers who are not interested in named jobs. Less beneficial for Slovakia and other Eastern European countries will be the situation of highly qualified immigrants, which we include in the term „brain drain“. The situation on the labour market of the United Kingdom and other developed countries, as well as the home countries of these workers, will remain unchanged in the near future. Therefore, no significant return migration can be expected from them. The space for these workers to find employment in the labour markets of both developed EU countries and the United Kingdom, despite Brexit, will not be narrowed. To outline the full picture of migrant workers' flows in the EU under the influence of Brexit, it requires examining the entire population of immigrants in the United Kingdom and occupied jobs and determining the full extent and intensity of return migration. At the same time, it is necessary to identify the immigration potential of the rest of the developed EU countries where part of the immigrants who lose their jobs in the United Kingdom would be able to re-migrate. Based on the overall course of Brexit related events and processes and the planned changes to the UK immigration policy, it can be anticipated that a more comprehensive and accurate picture of Brexit related return migration can only be explored and obtained after completing the entire set of procedural processes and negotiations associated with the full termination of the UK's EU membership.

Literature:

1. Adler-Nissen, R., Galpin, S., Rosamond, B.: *Performing Brexit: How a post-Brexit world is imagined outside the United Kingdom*. The British Journal of Politics and International Relations, 2017, Vol. 19, No 3, pp.573-591. <https://doi.org/10.1177/1369148117711092>.
2. Anderson, A.: *Integration of Polish Post-accession Migrants into British Society: The Impact of Education Levels and Skills*. ProQuest Dissertations Publishing, 2017.
3. Antonucci, L., Varriale, S.: *Unequal Europe, unequal Brexit: How intra-European inequalities shape the unfolding and framing of Brexit*. Current Sociology, 2019, Vol. 68, No 1, pp.41-59. <https://doi.org/10.1177/0011392119863837>
4. Baglioni, S., Biosca, O., Montgomery, T.: *Brexit, Division, and Individual Solidarity: What Future for Europe? Evidence*

- From Eight European Countries*. American Behavioral Scientist, 2019, Vol. 63, No 4, pp.538-550. <https://doi.org/10.1177/0002764219831738>
5. Barnard, C.: *Free Movement of Services, Migration and Leaving the EU*. National Institute Economic Review, 2016, Vol. 236, No 1, pp.23-30. <https://doi.org/10.1177/002795011623600104>
 6. Bermudez, R.E., López, L.F.Z.: *Trayectorias laborales de migrantes calificados retornados a la ciudad de Cali, Colombia*. Migraciones, 2019, Vol. 46, pp.35-61. [Labor trajectories of skilled migrants returned to the city of Cali, Colombia, in Spanish]. DOI: <https://doi.org/10.14422/mig.i46y2019.002>
 7. Bilan, Y.: *Migration aspirations on the outskirts of Europe: Social and economic dimensions*. Transformations in Business and Economics, 2014, Vol. 13, No 2B, pp.606-614.
 8. Bulat, A.: *'High-Skilled Good, Low-Skilled Bad?' British, Polish and Romanian Attitudes Towards Low-Skilled EU Migration*. National Institute Economic Review, 2019, Vol. 248, No 1, pp. R49-R57. <https://doi.org/10.1177/002795011924800113>
 9. Cavendish, C.: *Brexit gives Britain a chance to fix its immigration policy*. Financial Times, 2020, available at: <https://www.ft.com/content/175974c2-42b1-11ea-9a2a-98980971c1ff>, referred on 31/01.2020.
 10. Dhingra, S.: *Brexit and the Future of Trade*. Britain Beyond Brexit, 2019, Vol. 90 (S2), pp.21-31. <https://doi.org/10.1111/1467-923X.12645>
 11. Dhingra, S., Machin, S., Overman, H.: *Local Economic Effects of Brexit*. National Institute Economic Review, 2019, Vol. 242, No 1, pp. R24-R36. <https://doi.org/10.1177/002795011724200112>
 12. Divinský, B.: *Zahraničná migrácia v Slovenskej republike. Vývojové trendy od roku 2000*. 2007, available at: <https://www.iz.sk/download-files/sk/iom/sfpa-boris-divinsky-Zahranicna-migracia-v-Slovenskej-republike.pdf>, referred on 08/05/2019, [Foreign migration in the Slovak Republic, in Slovak].
 13. Duci, V., Dhembo, E., Vathi, Z.: *Prekarious Retirement for Ageing Albanian (Return) Migrants*. Sudosteuropa, 2019, Vol. 67, No 2, pp.211-233.
 14. Grmanová, E.: *Demografické zmeny a ich vplyv na trh práce*. Trenčín, TnUAD, 2018, p.104 [Demographic change and its impact on the labor market, in Slovak].
 15. Gumbrell-McCormick, R., Hyman, R.: *What about the workers? The implications of Brexit for British and European labour*. Competition & Change, 2017, Vol. 21, No 3, pp.169-184. <https://doi.org/10.1177/1024529417698514>
 16. Haluš, M., Hlaváč, M., Harvan, P., Hidas, S.: *Odliv mozgov po slovensky*. Ministerstvo financií SR, Inštitút finančnej politiky, 2017, available at: <https://www.finance.gov.sk/sk/me dia/komentare-ifp-uhp/odliv-mozgov-po-slovensky-januar-2017.html>, referred on 08/05/2019, [Brain drain in Slovak, in Slovak].
 17. Harrison, T.: *Fortress Britain? Ethical Approaches to Immigration Policy for a Post-Brexit Britain*. Theology, 2019, Vol. 122, pp.131-132. <https://doi.org/10.1177/0040571X18817441h>
 18. Kaufmann, E.: *Can Narratives of White Identity Reduce Opposition to Immigration and Support for Hard Brexit? A Survey Experiment*. Political Studies, 2017, Vol. 67, No 1, pp.31-46. <https://doi.org/10.1177/0032321717740489>
 19. Kordoš, M., Krajňáková, E.: *Significance of Innovation in Slovak Regions - Issues And Challenges*. Ad Alta-Journal of Interdisciplinary Research, 2018, Vol. 8, No 1, pp.137-141.
 20. Krajňáková, E., Navickas, V., Kontautiene, R.: *Effect of macroeconomic business environment on the development of corporate social responsibility in Baltic Countries and Slovakia*. Oeconomia Copernicana, 2018, Vol. 9, No 3, pp.477-492. <http://dx.doi.org/10.24136/oc.2018.024>
 221. Lumsden, K., Goode, J., Black, A.: *'I Will Not Be Thrown Out of the Country Because I'm an Immigrant': Eastern European Migrants' Responses to Hate Crime in a Semi-Rural Context in the Wake of Brexit*. Sociological Research Online, 2018, Vol. 24, No 2, pp.167-184. <https://doi.org/10.1177/1360780418811967>

22. MAC (Migration Advisory Committee), 2018, EEA migration in the UK: final report, available at, <https://www.gov.uk/government/publications/migration-advisory-committee-mac-report-eea-migration>, referred on 18/09/2019.
23. Masso, J., Mýtna Kureková, L., Tverdostup, M., Žilinčíková, Z.: *Return migration patterns of young return migrants after the crisis in the CEE countries: Estonia and Slovakia*. STYLE Working Papers, STYLE-WP 6.1 CROME, University of Brighton, 2016, Brighton, p.79.
24. Mulvey, G., Davidson, N.: *Between the crises: Migration politics and the three periods of neoliberalism*. Capital & Class, 2018, Vol. 43, No 2, pp.271-292. <https://doi.org/10.1177/0309816818780652>
25. Nölke, A.: *Brexit: Towards a new global phase of organized capitalism?* Competition & Change, 2017, Vol. 21, No 3, pp.230-241. <https://doi.org/10.1177/1024529417703016>
26. North, P.: *Local economies of Brexit*. Local Economy, 2017, Vol. 32, No 3, pp.204-218. <https://doi.org/10.1177/0269094217705818>
27. Parker, O.: *Critical political economy, free movement and Brexit: Beyond the progressive's dilemma*. The British Journal of Politics and International Relations, 2017, Vol. 19, No 3, pp.479-496. <https://doi.org/10.1177/1369148117711082>
28. Parutis, P.: "Economic Migrants" or "Midling Transnationals"? *East European migrants' experiences of work in the UK*. International Migration, 2011, Vol. 52, No 1, pp.36-55. <https://doi.org/10.1111/j.1468-2435.2010.00677.x>
29. Portes, J.: *Immigration after Brexit*. National Institute Economic Review, 2016, Vol. 238, No 1, pp. R13-R21. <https://doi.org/10.1177/002795011623800111>
30. Rizman, T., Sacherová, K.: *Host' do domu. Analýza príchodov a odchodov obyvateľstva na Slovensko*. Inštitút finančnej politiky, Komentár 2018/6, [Guest to the house. Analysis of arrivals and departures of the population to Slovakia, in Slovak].
31. Rolfe, H., Ahlstrom-Vij, V., Hudson-Sharp, J., Runge, R.: *Post-Brexit immigration policy: reconciling public perceptions with economic evidence*. London, NIESR and Birkbeck. (2018)
32. Rolfe, H.: *Challenges for Immigration Policy in Post-Brexit Britain: Introduction*. National Institute Economic Review, 2019, Vol. 248, No 1, pp. R1-R4. <https://doi.org/10.1177/002795011924800108>
33. Rolfe, H., Runge, J., Hudson-Sharp, N.: *Immigration Policy from Post-War to Post-Brexit: How New Immigration Policy can Reconcile Public Attitudes and Employer Preferences*. National Institute Economic Review, 2019, Vol. 248, No 1, pp. R5-R16. <https://doi.org/10.1177/002795011924800109>
34. Siles-Brügge, G.: *Bound by Gravity or Living in a 'Post Geography Trading World'? Expert Knowledge and Affective Spatial Imaginaries in the Construction of the UK's Post-Brexit Trade Policy*. New Political Economy, 2019, Vol. 24, No 3, pp.422-439. <https://doi.org/10.1080/13563467.2018.1484722>
35. Srovnalíková, P., Kordoš, M., Havierníková, K.: *Students' Engagement into Family Business in terms of Cluster Cooperation within Family Businesses*, Vision 2020: Sustainable Economic Development and Application of Innovation Management, 32nd Conference of the International-Business-Information-Management-Association (IBIMA, 2018), Seville, pp.5079-5088.
36. Sumption, M.: *Is Employer Sponsorship a Good Way to Manage Labour Migration? Implications for Post-Brexit Migration Policies*. National Institute Economic Review, 2019, Vol. 248, No 1, pp. R28-R39. <https://doi.org/10.1177/002795011924800111>
37. Tammes, P.: *Investigating Differences in Brexit-vote Among Local Authorities in the UK: An Ecological Study on Migration- and Economy-related Issues*. Sociological Research Online, 2017, Vol. 22, No 3, pp.143-164. <https://doi.org/10.1177/1360780417724067>
38. Tupá, M.: *Consequences of labour migration and migration management*. Sociálno-ekonomická revue, 2017, Vol. 2, pp.79-85.
39. Tupá, M., Vojtovič S.: *Impact of Brexit on the migration in the UK*. Ad Alta - Journal of Inderdisciplinary Research, 2018, Vol. 8, No 2, pp.306-309.
40. Vousden, K.H.: *Brexit negotiations: what is next for science?* Embo Reports, 2019, Vol. 20, No 4, pp.1-2. <https://doi.org/10.15252/embr.201948026>
41. Walter, S.: *Better off without You? How the British Media Portrayed EU Citizens in Brexit News*. The International Journal of Press/Politics, 2019, Vol. 24, No 2, pp.210-232. <https://doi.org/10.1177/1940161218821509>
42. White, W.: 'Polish migration to the UK compared with migration elsewhere in Europe: a review of the literature'. Social Identities, 2016, Vol. 22, No 1, pp.10-25. <https://doi.org/10.1080/13504630.2015.1110352>
43. Wincott, D.: *Brexit dilemmas: New opportunities and tough choices in unsettled times*. The British Journal of Politics and International Relations, 2017, Vol. 19, No 4, pp.680-695. <https://doi.org/10.1177/1369148117725316>
44. Wincott, D., Peterson, J., Convery, A.: *Introduction: Studying Brexit's causes and consequences*. The British Journal of Politics and International Relations, 2017, Vol. 19, No 3, pp.429-433. <https://doi.org/10.1177/1369148117713481>

Primary Paper Section: A**Secondary Paper Section: AH**

INTERNATIONAL INFORMATION SECURITY

^aYEVHENIJA VOZNYUK, ^bMYKHAYLO KUNYTSKYI,
^cNAZAR MYKHALIUK, ^dOLEKSANDR NOVAK

^a*Department of International Affairs and Regional Studies,
Lesya Ukrainka Volyn National University, 13 Voli str., 43021,
Lutsk, Volyn region, Ukraine*

^b*Department of World History and Philosophy, Lesya Ukrainka
Volyn National University, 13 Voli str., 43021, Lutsk, Volyn
region, Ukraine*

^{c,d}*Department of International Communication and Political
Analysis, Lesya Ukrainka Volyn National University, 13 Voli
str., 43021, Lutsk, Volyn region, Ukraine*
emails: ^avoznyuk.yevhenija@vnu.edu.ua, ^b2757mk@gmail.com,
^cnazar.mykhaliuk@vnu.edu.ua, ^dnovakoleksandr93@gmail.com

Abstract: Features of the current stage of development of international cooperation of developed democracies show the need to form specific approaches to international cooperation, which would be based on the principles of information security of each of the member states of international events. The global threats that have arisen with the development of information and communication technologies carry the danger of their use to destructively affect a democratic society by formal and informal structures of countries focused on external aggression and revanchism. All this affects the national information security of each state and requires the formation of a set of measures aimed at countering such threats. At the same time, the international nature of information security threats necessitates the development of a joint information security strategy and the development of interstate cooperation within international organizations.

Keywords: information security, state security, international security, information communications, international cooperation, international organizations

1 Introduction

The formation of the issue of international information security has stood out in international practice since the mid-90s of the last century. This was facilitated by a number of factors, first of all - the variety of negative manifestations of the use of information and communication technologies. These new technologies have been able to have a negative impact on the realization of fundamental human rights and freedoms, as well as on the integrity of state structures. Their rapid and large-scale development, the diverse impact on the subjects of relations, and the growing dependence of the world community on the proper functioning of information and communication networks and systems have increased attention to these new problems from both practical and theoretical points of view.

In addition, many confrontations between the intelligence agencies of different countries, their military structures, as well as economic and information battles, including economic espionage and financial sabotage, unfold in cyberspace. This fact determines the high importance of the processes taking place in the information space for modern political analysis, theory, and practice of political science and the recognition of information security as an element of the national security system.

Thus, there is currently a need to study the current problems of ensuring information security, protection of the national information space in view of real and potential threats, and destructive propaganda and manipulative information influences. This issue is especially relevant in Ukraine, which is the object of external information expansion, manipulative propaganda technologies, and destructive information invasion. In the conditions of the Russian-Ukrainian conflict. There is a need to protect the national information space from negative information and psychological influences, as well as to guarantee information security and information sovereignty as factors in the functioning of Ukraine as a sovereign and independent state.

2 Literature review

Information security, problems of protection of the national information space have been studied by many scientists. In particular, it is worth noting the study of this issue, which is reflected in the works of A. I. Marushchak (2007), M. V.

Markova (2016), V. A. Lipkan (2006), B. A. Kormych (2004), and other experts. Among the topics considered by these researchers, theoretical issues on certain aspects of international legal issues of the Institute of International Information Security, issues of cooperation within regional international organizations took a significant place. To some extent, the role of the UN and ITU in shaping the norms of the institute of international information security was studied. In addition, in terms of innovative changes in information security, the nuances of cybersecurity, which are revealed in the studies of V. L. Buriachok (2011), D. V. Dubov (2011), V. Petryk (2009), G. Pocheptsov (2015), M. Pogoretsky (2009), V. P. Shelomentsev (2012) and other scientists. In certain aspects, information security of the state concerns even the specifics of business processes, which is revealed in the works of O. Stashchuk (2021), T. Shmatkovska (2020), V. Yakubiv (2019), M. Dziamulych (2020).

However, in the works of the above-mentioned experts, information security has been studied mainly as an integral element of national security and its integral component. At the same time, scientists have ignored the practical problems of clearly delineating information threats, studying their sources, comprehensive study of technologies of information and psychological wars and operations, identification and justification of methods to combat information and psychological negative influences. At the same time, as threats to the information security of the state in the modern conditions of information society development are dynamic and constantly changing, the relevant issues of scientific research do not lose their relevance to this day.

3 Material and methods

In modern worldview and philosophical thought, two main approaches to understanding the concept of "national security" are used. The founder of the first, realistic approach to understanding this concept is the American political scientist G. Morgenthau, who defined national security as the inviolability of the territory and institutions of the state, emphasizing military and political security, which is a traditional understanding. The second approach – Human Security – developed within the idealist theory of international relations and was characterized by the analysis of military, political, economic, social, humanitarian, environmental problems (Blumenau, 1985).

We consider it expedient to define the provisions common to the two concepts. They are characterized by the same awareness and understanding:

- 1) the place and importance of information technology, their relationship within the information space (cyberspace), the role in the implementation of the general concept of the information society;
- 2) the need to protect critical national infrastructures, global information and communication networks, and systems, as well as the integrity of accumulated information;
- 3) the complexity, severity, and number of threats to information and communication technologies related to both natural and anthropogenic processes and human activities;
- 4) ineffectiveness of traditional strategies (such as measures similarly applied in the process of arms control or deterrence);
- 5) state tasks arising at the national and international levels;
- 6) the need to join forces in order to preserve and expand the contribution that information and communication technologies make to ensuring the security and integrity of states;
- 7) the need for international cooperation in the development of risk reduction strategies for information and communication technologies (Zabara, 2013).

Thus, the architecture of the study of information security corresponds to the national security approach, due to the specifics of the object of study and is interrelated research, which in its organic set lays the foundations for a holistic view of information security in Ukraine and Europe in particular, as well as approaches to ensuring information security of Ukraine in the context of European integration.

4 Result and discussion

Information security is an integrated component of national security and is considered a priority function of the state. Information security, on the one hand, provides quality comprehensive information to citizens and free access to various sources of information, and on the other – is to control the spread of misinformation, promote the integrity of society, preserve information sovereignty, combat negative information, and psychological influences and protect national information space from manipulation, information wars, and operations. The solution to the complex problem of information security will allow protecting the interests of society and the state, as well as guarantee the rights of citizens to receive comprehensive, objective, and high-quality information.

There are two aspects to the interpretation of information security in the context of national security. On the one hand, information security is considered as an independent element of national security of any country, and on the other – an integrated component of any other security: military, economic, political, etc. The most complete definition is: information security is a state of protection of vital interests of the individual, society, and the state, which minimizes damage due to incompleteness, timeliness, and inaccuracy of information, negative information impact, negative consequences of information technology, as well as unauthorized dissemination information (Illytska, 2016). This definition is optimal and reflects all aspects of the interaction of the subjects of information relations.

It should be noted that the development of information technologies is not only an important state function but also a prerequisite for ensuring the effective use of information resources accumulated by society to create a developed and secure information environment. This purpose is the organization of the information security system, the components of which are national interests in the information sphere, threats to these interests, information security itself as a tool to create favourable conditions for their implementation, which together constitute the object of government management, a system ensuring information security, i.e. the subject of management, moreover, the main directions of national security policy in the information sphere, as well as the internal and external environment.

It is clear that information security is provided by a set of measures, according to their study, some scientific attention is paid.

In practice, there are several types of methods of information security:

- one-level methods, which are based on one principle of information security management;
- multilevel methods are based on several principles of information security management, each of which serves to solve its own problem. At the same time, private technologies are not interconnected and are aimed only at specific factors of information threats;
- integrated methods – multilevel technologies, which are combined into a single system of coordinating functions at the organizational level to ensure information security based on the analysis of a set of risk factors that have a semantic connection or are generated from a single information centre of information impact;
- integrated highly intelligent methods - multilevel, multi-component technologies, which are built on the basis of powerful automated intelligent tools with organizational management (Lipkan, 2006).

Current research on the essence of information security also takes into account the fact that its essence is the inner content of the subject, which finds expression in the stable unity of all diverse and contradictory forms of existence. The basic characteristic of information security should be considered the probability of the threat of increased risk of threat or danger to the individual, society, and the state. The criterion for the effectiveness of information security is a high level of security at a minimum of the corresponding costs. So we can talk about the structure of the concept of information security. Its main element is the vital interests of the social system, which are correlated with external factors in the form of the interests of supranational or other nation-state structures within the international community. Within the national-state formation, its vital interests are in interaction with the interests of the elements that make up this formation. The latter are social groups, elites, organizations, parties, religious and ethnic groups, movements, and more. The combination of internal and external information threats creates the preconditions for the disruption of the safe functioning of the public administration system.

Political discussions at the International Seminar on Information Security, held in 1999 in Geneva and held under the auspices of the United Nations Institute for Disarmament Research (UNIDIR) with the participation of the Department for Disarmament Affairs of the UN Secretariat and representatives of more than one day. fifty countries around the world confirmed the urgency of the problem and the timeliness of its consideration within the UN. In determining the approaches to its solution, different positions were identified that corresponded to the strategic interests of the participants in the discussion.

The position of developed countries provided for the recognition of the problem of international information security as:

- hypothetical power confrontation;
- transfer of the concept of international information security to the regional or thematic level;
- selection of such components as criminal and terrorist international information threats from the complex problem of international information security and creation of an international mechanism for control of such information crimes.

The position of countries that do not belong to the Western model of civilization provided the following proposals:

- establishment of an international legal norm on the prohibition of the use of means of influencing information resources and information potential of international, regional, and national purposes;
- creation of a special International Court of Information Crime;
- joint development of global protection against information aggression.

The Statement of the International Meeting proclaimed the approval of the Program of Action for the Prevention of Information Wars and the Limitation of the Information Arms Race.

The Geneva meeting revealed a strategic problem of international information security - the problem of dominance in the global information sphere with the use of information weapons, i.e. the desire to control large territories and societies, the problem of information imbalance of international law (Borysova, 2013).

However, in the information society begins to change not only the level of automation of production but also the production itself – its product becomes more capacious, which means an increase in the share of innovation, design, and marketing in its value. The production of information rather than a tangible product determines the information society. Knowledge becomes the main strategic resource of such a society, information penetrates into all spheres of society and the state. The point is

that the concept of the “information sphere” is being adjusted. These processes are actively taking place in the information-developed countries of the world, in particular in the countries of the European Union.

Conceptually, it can be argued that national security is a holistic existential phenomenon, so it cannot be represented by a set of correlatively related components (economic, information, political security, etc.). National security should be analysed through the prism of its systemic properties, so it is advisable to talk about national security in the information sphere, environmental, and others. After all, with the advent of other “components”, national security as such will not change its essence. At the same time, when it comes to manifestations of national security in various spheres of life, the emergence of new social relations or spheres of life will not affect the content of national security in any way, only change its form, as national security will be manifested in new spheres. Therefore, the level of information security of the state is largely determined by the level of its information infrastructure.

The fact is that there are two main areas of international legal regulation of the use of information and communication technologies: information (“content”) and communication (“technical”). In the doctrine, the relevant information and communication elements are defined as functional.

In the international legal issues of information security, they are considered from the standpoint of counteracting the use of information and communication technologies aimed at harming fundamental human rights and freedoms and critical structures of states. In particular, in the case of information (“content”) – it is to counteract the cross-border dissemination of information through information and communication technologies, which contradicts the principles and norms of international law, incites ethnic, interracial, and interfaith hostility, disseminates racist, xenophobic written images or any demonstration of ideas or theories that promote, incite hatred, discrimination or violence against any person or group of persons. In addition, manifestations can be expressed through the use of information infrastructure to house information resources that promote violence in order to intimidate, suppress, and impose certain behaviours; spreading calls for the overthrow of the existing state system and government in other states, carrying out extremist and terrorist acts; reports on committed or planned acts (including in information and communication networks), etc. (Zabara, 2012). In the case of the communication (“technical”) direction, it is counteracting the use of communication systems, processes, and resources against communication networks and critical structures of other states, which harms the functioning of financial, political, economic, and social systems.

These functional elements (information and communication) are closely related to the structural elements (criminal, terrorist, and military). In fact, there is a situation when each of the structural elements corresponds to a certain range of multilevel functional elements. This link is confirmed by the provisions of a number of regional international agreements, in particular: The Convention on Cybercrime of 23 November 2001 and the Additional Protocol to the Convention on Cybercrime, which criminalizes acts of a racist and xenophobic nature committed through computer systems of January 28, 2003 adopted by the Council of Europe.

However, it should be noted that national interests in the information sphere are derived from national values. Thus, the interests of information security derive from such values as human rights, freedom, economic prosperity, and the power of the country. That is why the main interest for Ukraine is its survival as a free, independent nation while preserving fundamental values and security institutions. One of the mechanisms for guaranteeing this process is an effectively functioning system of public administration, which is the subject and object of information security at the same time. And in this case, the efforts of many countries to ensure their own information security at the expense of other countries are of

concern, on the one hand, and on the other - confidence in the need to form a viable system of information security of the government. Therefore, information security acts as a characteristic of a stable, stable state of the public administration system, which under the influence of internal and external threats and dangers retains essential characteristics for its own existence.

In this aspect, an effective mechanism for ensuring the integrity of the individual, society, and the state as a single organism is the state management of national information security. Despite the priority and value of the interests of a particular person, any developed country builds its own system through the primacy of public administration. This does not mean the de facto exclusion of specific citizens and public organizations from the process of ensuring the national security of the state. Strictly speaking, vital interests reflect the fundamental, basic needs of the state, violations or inability to meet which can lead to its collapse. Because of this, it is natural that each state has its own national interests. This important point should be taken into account when creating systems of collective, international, global information security.

It should be noted that attention to the problem of information security has not bypassed Ukraine, which has recently suffered from anti-Ukrainian influence, which promotes separatism, violence, national enmity and is an attempt to destroy Ukraine's national identity, destroy ethnic harmony, encroach on the constitutional order of Ukraine, the territorial integrity of the state, etc. The problem of ensuring information security of Ukraine became relevant during the war in the East when the Russian Federation is information expansion, biased and biased coverage of facts and phenomena, and technology of Russian information and psychological operations aimed at ensuring dominance in the Ukrainian (as well as global) information space and to maintain media advantage. Through Russian propaganda information and psychological campaigns, actions, and media events, not only the public consciousness of the citizens of Ukraine is influenced, but also the world community.

Therefore, taking into account these threats, measures to ensure the information security of Ukraine should be carried out by ensuring the information sovereignty of Ukraine; improvement of state regulation of information sphere development by creating normative-legal and economic preconditions for the development of national information infrastructure and resources, the introduction of the newest technologies in this sphere, filling of internal and world information space with reliable information about Ukraine; ensuring strict observance of the constitutional right of citizens to freedom of speech, access to information, prevention of illegal interference of public authorities, local governments, their officials in the activities of the media, discrimination in the information sphere and harassment of journalists for political positions; taking comprehensive measures to protect the national information space and counteract the monopolization of the information sphere of Ukraine, etc.

5 Conclusions.

In order to prevent information expansion, the activities of the state in the information space should be carried out in the following areas:

- 1) implementation of preventive strategy and tactics (preventive measures);
- 2) implementation of the response strategy (prompt response to information attacks of the enemy and active offensive);
- 3) protection of the national information space.

The main purpose of these measures is to ensure dominance and media advantage in the information space. In addition, the priority tasks of information structures of government bodies should be: control over information flows; providing objective, comprehensive information, providing professional comments and explanations about events; systematic coverage of the

official position of officials and political leaders.

Thus, in the conditions of modern information confrontations, the expansionist policy of the Russian Federation, the national information space of Ukraine is insufficiently protected from external negative propaganda informational and psychological influences, threats. Therefore, the protection of information sovereignty, the creation of a powerful and effective system of information security of Ukraine, the development of effective strategies and tactics to combat media threats should become priorities of public authorities and non-governmental institutions.

In the modern development of the information society, the protection of the national information space and information security has already become priority strategic objectives of many countries. Information security is recognized as an integral part of the national security system. At the same time, information security as a component of the national security of the state can be considered as an independent part.

The international nature of information security threats necessitates the development of a joint information security strategy and the development of interstate cooperation within international organizations in this area.

Issues of information security are extremely important for the Ukrainian state at the present stage, which is primarily due to the need to resist illegal encroachments on the information space of Ukraine. Given that European integration is a strategically recognized priority of Ukraine's foreign policy, the task for the Ukrainian authorities should be to develop an effective dialogue with the EU on information security. In addition, it is necessary to study in detail the practical experience of foreign countries that already have an organizational and legal basis for information security and make the most of their experience in national legislation and the implementation of effective measures in this area.

Literature:

- Agres, O., Sadura, O., Shmatkovska, T., Zelenko, S. Development and evaluation of efficiency of leasing activities in agricultural sector of Ukraine. *Scientific Papers: Series «Management, Economic Engineering in Agriculture and Rural Development»*. 2020. 20(3), 53-60. ISSN 2284-7995.
- Apostolyuk, O., Shmatkovska, T., Chykalo, I., Husak, A. Assessment of the rural population economic activity in the system of united territorial communities development: a case study of Volyn Region, Ukraine. *Scientific Papers: Management, Economic Engineering in Agriculture & Rural Development*. 2020. 20(3), 99-108. ISSN 2284-7995.
- Blumenau, D. I. Information: myth or reality? (On the state of the concepts of "knowledge" and "social information"). *Scientific and technical information*. 1985. 2(2), 1-4. ISSN 0548-0019.
- Borisova, L. V., Tulupov, V. V. Information security as a determining component of national security of Ukraine. *Law and Security*. 2013. 1(48), 39-42. ISSN 1727-1584.
- Buryachok, V. L. Cyber security – the main factor of sustainable development of modern information society. *Modern special equipment*. 2011. 3, 104-114. ISSN 2411-3816.
- Dubov, D. V. *Information society in Ukraine: global challenges and national opportunities*. Kyiv: NISD. 2010. 64 p. ISBN 966-316-006-3.
- Dziamulych M., Moskovchuk A., Vavdiuk N., Kovalchuk N., Kulynych M., Naumenko, N. Analysis and economic and mathematical modeling in the process of forecasting the financial capacity of milk processing enterprises of the agro-industrial sector: a case study of Volyn region, Ukraine. *Scientific Papers Series «Management, Economic Engineering in Agriculture and Rural Development»*. 2021. 21(1), 259-272. ISSN 2284-7995.
- Dziamulych, M., Sadovska, I., Shmatkovska, T., Nahirska, K., Nuzhna, O., Gavryliuk, O. The study of the relationship between rural population spending on peasant households with the main socioeconomic indicators: a case study of Volyn region, Ukraine. *Scientific Papers: Management, Economic Engineering in Agriculture & Rural Development*. 2020. 20(2), 217-222. ISSN 2284-7995.
- Dziamulych, M., Shmatkovska, T., Gordiichuk, A., Korobchuk, T. Estimating peasant farms income and the standard of living of a rural population based on multi-factorial econometric modeling: a case study of Ukraine. *Scientific Papers: Series «Management, Economic Engineering in Agriculture and Rural Development»*. 2020. 20(1), 199-206. ISSN 2284-7995.
- Dziamulych M., Yakubiv V., Shubala I., Filiuk D., Korobchuk L. Analysis and evaluation of the rural labour market and employment of the rural population: a case study of Volyn region, Ukraine. *Scientific Papers Series «Management, Economic Engineering in Agriculture and Rural Development»*. 2020. 20(4), 165-174. ISSN 2284-7995.
- Ilnytska, U. Information security of Ukraine: modern challenges, threats and mechanisms of counteraction to negative information-psychological influences. *Humanitarian vision*. 2016. 2(1), 27-32. ISSN 2411-8060.
- Lipkan, V. A., Maksymenko, Y. E., Zhelikhovsky, V. M. *Information security of Ukraine in the context of European integration*. Kyiv: KNT. 2006. 280 p. ISBN 966-373-116-8.
- Kormych, B. A. *Information security of Ukraine: organizational and legal bases*. Kyiv: Kondor. 2004. 384 p. ISBN 978-966-8391-19-4.
- Marushchak, A. I. *Information law: Access to information*. Kyiv: KNT, 2007. ISBN 978-966-373-272-5.
- Markova, M. V., Markov, A. R. Information and psychological war against the population of Ukraine as a modern reality: the state of the problem and ways to overcome the consequences. *Integrated Communications*. 2016. 2, 73-85. ISSN 2524-2644.
- Petryk, V., Zharkov, J., Dziuba, M. Dangers of personality in the information space. *Legal journal*. 2007. 2, 45-46. ISSN 2524-0374.
- Pocheptsov, G. *Modern information wars*. Kyiv: Kyiv-Mohyla Academy. 2015. 497 p. ISBN: 978-966-518-674-8.
- Pogoretsky, M., Shelomentsev, V. The concept of cyberspace as an environment for committing crimes. *Information security of man, society, state*. 2009. 2, 77-81. ISSN 2073-7378.
- Shelomentsev, V. P. Legal support of the system of cyber security of Ukraine and the main directions of its improvement. *Fight against organized crime and corruption (theory and practice)*. 2012. 1, 312-320. ISSN 1609-0462.
- Shmatkovska, T., Dziamulych, M., Gordiichuk, A., Mostovenko, N., Chyzh, N., Korobchuk, T. Trends in human capital formation and evaluation of the interconnection of socio-demographic processes in rural area: a case study of Volyn region, Ukraine. *Scientific Papers: Series «Management, Economic Engineering in Agriculture and Rural Development»*. 2020. 20(2), 437-444. ISSN 2305-7645
- Shmatkovska, T., Dziamulych, M., Yakubiv, V., Myshko, O., Stryzheus, L., Yakubiv, R. Economic efficiency of land use by agricultural producers in the system of their non-current assets analysis: a case study of the agricultural sector of Ukraine. *Scientific Papers: Management, Economic Engineering in Agriculture & Rural Development*. 2020. 20(3), 543-554. ISSN 2284-7995.
- Shmatkovska T., Nikolaeva, A., Zabedyuk, M., Sheiko, Yu., Grudzevych Yu. Increasing the efficiency of the labour resources usage of agrosector enterprises in the system of sustainable development of the rural territories: a case study of Ukraine. *Scientific Papers Series «Management, Economic Engineering in Agriculture and Rural Development»*. 2020. 20(4), 467-476. ISSN 2284-7995.
- Sodoma R., Skhidnytska H., Shvorak A., Shmatkovska T., Zhurakovska I. Peculiarities of agrarian receipts as a modern financial tool. *Economic annals-XXI*. 2018. 169 (1-2), 46-49. ISSN 1728-6220.
- Stashchuk, O., Boiar, A., Shmatkovska, T., Dziamulych, M., Skoruk, O., Tesliuk, S., Zintso, Yu. Analysis of fiscal efficiency of taxation in the system of filling budget funds in Ukraine. *AD*

ALTA: Journal of interdisciplinary research. 2021. 11(1), Special Issue XVII, 47-51. ISSN 1804-7890.

25. Stashchuk, O., Shmatkovska, T., Dziamulych, M., Kupyra, M., Vahnovska, N., Kosinskyi, P. Model for efficiency evaluation of financial security management of joint stock companies operating in the agricultural sector: a case study of Ukraine. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*. 2021. 21(1), 715-728. ISSN 2284-7995.

26. Tofan, I. N., Ahres, O. H., Shmatkovska, T. O., Problems in administration of real estate tax other than land in Ukraine. *Scientific bulletin of Polissia*. 2017. 3 (11), 148-153. ISSN 2410-9543.

27. Tsymbaliuk, I. O., Shmatkovska, T. O., Shulyk, Y.V., 2017, Tax alternatives to implement the tax capacity of internet activity in Ukraine. *Financial and credit activity: problems of theory and practice*. 2017. Vol. 22, 336-344. ISSN 2305-4994.

28. Yakubiv, V., Sodoma R., Hrytsyna, O., Pavlikha, N., Shmatkovska, T., Tsymbaliuk, I., Marcus, O., Brodska, I. Development of electronic banking: a case study of Ukraine. *Entrepreneurship and Sustainability Issues*. 2019. 7(1), 219-232. ISSN 2345-0282.

29. Yanyshyn, Ya., Sodoma, R., Markiv, G., Lipych, L., Shmatkovska, T., Shidnytzka, G. Economic efficiency of the nuts complex business in the agriculture of Ukraine. *Scientific Papers Series «Management, Economic Engineering in Agriculture and Rural Development»*. 2020. 20(2), 531-536. ISSN 2284-7995.

30. Zabara, I. M. International information security in international law: to the question definition. *Ukrainian Journal of International Law*. 2012. 4, 63-69. ISSN 1814-3385.

31. Zabara, I. M. International information security: modern concepts in international law. *Theory and practice of jurisprudence*. 2013. Vol. 2. ISSN 2225-6555.

32. Zhurakovska, I. V., Sydorenko, R. V., Shmatkovska, T. O., Brodska, I. I. Factors of influence on employment in small and medium-sized business in Ukraine. *Financial and credit activity: problems of theory and practice*. 2020. 32(1), 109-119. ISSN 2305-4994.

Primary Paper Section: A

Secondary Paper Section: AD, AG, BD

WHAT IS THE PRICE OF OUTDOOR ADVERTISING: A CASE STUDY OF THE CZECH REPUBLIC?

^aJAROSLAV ZAHŘÁDKA, ^bVERONIKA MACHOVÁ, ^cJIŘÍ KUČERA

^a*Institute of Technology and Business in České Budějovice, School of Expertness and Valuation, Okružní 517/10, 370 01 České Budějovice, Czech Republic*

^b*Institute of Technology and Business in České Budějovice, School of Expertness and Valuation, Okružní 517/10, 370 01 České Budějovice, Czech Republic*

^c*University of Žilina, The Faculty of Operation and Economics of Transport and Communications, Department of Economics, Univerzitná 8215/1, 01026 Žilina, Slovakia*
email: ^a27164@mail.vstecb.cz, ^bmachova@mail.vstecb.cz, ^ckuceraj@mail.vstecb.cz

Abstract: The aim of the paper is to analyze the price of outdoor advertising in various regions of the Czech Republic. The base source of data is the website plakatov.cz, from which the prices of outdoor advertisement in individual regions were obtained. The results show that the prices of outdoor advertisement in the individual regions are the same. The main difference is in how many outdoor advertisements are located in individual regions for the lowest and how many for the highest price. An overview was created, which shows what is the price of outdoor advertisement in each region, how many ads are located in each region and subsequently, the data is displayed using a map. The results show that the cheapest outdoor advertisement is located in the Hradec Králové region. The price of the outdoor advertisement in the Hradec Králové Region is CZK 5,204. On the contrary, the most expensive outdoor advertisement is in Prague. The price of outdoor advertising in Prague is CZK 16,567. Most outdoor advertisements are located in Prague. There are 174 outdoor advertisements in Prague. The lowest number of outdoor advertisements is in the Pardubice and Zlín regions. There are 18 outdoor advertisements in both regions. The difference between outdoor advertisements in the Pardubice and Zlín regions is in their price. While in the Zlín Region outdoor advertising costs CZK 6,466, in the Pardubice Region it costs CZK 12,333. The results are beneficial for people who are interested in outdoor advertising. They are mostly beneficial for outdoor advertising producers to know their standing compared to their competition and other regions.

Keywords: advertising, outdoor advertising, outdoor advertising price, TV advertising price, trends in outdoor advertising

Introduction

The ubiquitous advertisements that we encounter on television, radio, the press and outside on the street have been affecting customers for decades, but the issue of outdoor advertising is not much addressed in research circles. It was this finding that strongly motivated us to address this issue. Advertising and other forms of commercial communications are entering a new world. Theorists are talking about a kind of revolution 4.0 full of digitization, automation, and robotics. It is supposed to bring a big change for consumers. There is speculation, for example, that we should receive products and services made, so to speak, tailor-made. Thus, the endless waste of resources, production for production and growth for growth will be reduced (Vysekalová and Mikeš, 2018).

Advertising has long appeared on various social networks. We can encounter it most often on, for example, Facebook, Instagram, or YouTube. For example, on YouTube we may encounter non-skippable and skippable advertisements. Skippable ads allow uninterested users to skip an ad after a few seconds. Skippable ads have seen great growth in recent years (Chakraborty, 2021). If we are watching an ad, the speed of expression of the actors in advertising plays a key role in understanding what the announcers are saying. When they are speaking too fast, we pay less attention to the true content of their speech. Rodero (2020) proved that people understood medium-speed advertising (180 words per minute) best.

In today's postmodern society, one of the key abilities is to attract recipients. Outdoor advertising also has this ability to attract recipients. Outdoor advertising, also known as advertising, away from home, is advertising that reaches consumers when they are outside of their place of residence. The most well-known types of outdoor advertising include billboards, posters, hanging signs. A big problem with these outdoor ads is their excessive luminosity. Excessive brightness

of outdoor LED displays at night is widely used in urban areas, which poses potential safety risks for vehicle operation at night (He, 2021). Palmer (2021) states that a certain disadvantage of outdoor advertising is the fact that it can reinforce social inequalities in health. Vulnerable populations in disadvantaged areas may be more exposed to advertisements for fast food, gambling, and alcohol. This can encourage the consumption of fast food and alcohol. It can also entice a person to start gambling. The price of outdoor advertising in the Czech Republic depends on the type of outdoor advertising the customer requires. Another factor influencing the price of outdoor advertising can be considered the location (placement) of advertising. The aim of the paper is to find out what the price of outdoor advertising in the Czech Republic is. We will focus on the price of outdoor advertising in each region and then compare the prices of outdoor advertising in individual regions in the Czech Republic. We will find out in which region outdoor advertising is the most expensive, in which region it is the cheapest and how many advertisements are located in each region.

1 Literature research

Advertising is an integral part of our daily lives, because it is present everywhere (on the street, at work, at school, at home), accompanies us in every situation and affects us. Act No. 40/199 coll., on the regulation of advertising, states: "Advertising means an announcement, persuasion or other presentation disseminated mainly by communication media, aimed at promoting business activities, in particular promoting the consumption or sale of goods, construction, rental or sale of other real estate, sale or use of rights or obligations, promotion of services, promotion of a trademark, unless stated otherwise." There are several types of advertising. Recently, programmatic advertising has become very widespread. Programmatic advertising is a nascent and rapidly growing information technology phenomenon that responds to and influences consumers and their behavior. Calculating an ad budget is very difficult. To calculate an advertising budget, it's important what budget we have available. There is no general rule for determining the cost of advertising. There are usually four basic methods that can be used when creating a budget. These are: the residual budget method, the potential revenue share method, the competitive parity method and the goal-oriented method. There are different types of cost modeling for communication campaigns. They differ in the number of factors they take into account and the way they are used in practice. The experience we have with an implemented campaign is very important for compiling a budget (Vysekalová, Mikeš, 2018). Advertising can be encountered at every step. Outdoor advertising is one of the forms of communication between a company and the market.

Outdoor advertising includes various types of promotional banners, from roadside billboards to posters in vehicles and advertising in arenas, all of which focus on communicating to the public on a large scale. Digital billboards, as a new form of outdoor advertising, have gained popularity in recent years thanks to a revolutionary way of controlling when and where specific advertisements appear. However, this development also requires more complex optimization for strategic deployment. Huank (2020) proposed three optimization models that take into account different advertising needs: a dynamic audience model to maximize target audience coverage, a dynamic environment model to maximize target environment coverage, and a dynamic integrated model to jointly maximize target audience and environment. The results show that these proposed models are effective in providing an optimal solution for the digital configuration of the billboard, covering most of the target groups and the environment. It is very important for billboards to be placed in the right location. Zhang (2020) addressed the issue of influential billboard placement based on trajectory. Due to the set of billboards (U), the trajectory database (T) and the budget

(L), he found a set of billboards within the budget. One of the main tasks is to identify and reduce the overlap of different billboards on the same trajectory. Belov (2020) has developed possible solutions to improve the adaptability of digital outdoor advertising. He created a mathematical model for placing smart ads and proposed an algorithm to find an effective schedule for displaying ads. An evaluation of the effectiveness of a set of ads placed in accordance with the proposed approach is provided as a sample check. The proposed model can be used to control a distributed outdoor advertising system using IoT technology. There is a problem quantifying the effectiveness of outdoor advertising. To solve this problem, it is proposed to use methods for evaluating the parameters of advertising and terminology, which are actively used in online advertising. However, pricing, placement and evaluation of the effectiveness of advertising messages on the Internet and on the street follow different rules. The main criterion for the effectiveness of this type of advertising on the Internet is the clickthrough rate. Wilson (2015) proposed a statistical model. This model is used to increase the efficiency of scheduling, to display ads, and also to determine where outdoor ads are placed. Using IoT technology, it is possible to collect information about microsections. To do this, we need to install a sensor at a selected location that can communicate with gadgets transmitted by people via Wi-Fi. The device works on the principle of scanning the surrounding space and collects MAC data of the device, which is not personal data. The system can also transmit aggregated data and study the dynamics of human flow. When creating a dynamic system, it will be necessary to solve problems with storing and processing very large amounts of data. A large number of factors affect outdoor advertising.

It is not clear what factors influence the recognition of outdoor advertising. Tsuji (2017) identified the effects of corporate colors and brand image on recognition. When ads use the corporate colors of the advertised companies, then it affects the recognition of outdoor advertising. To test this, he conducted two questionnaires. Consumers are more likely to recognize ads when the corporate colors of the advertised companies are used, and consumers are aware of what the corporate color is. The results show that consumers are more likely to recognize ads when the brand image is high for the advertised companies. Wilson (2015) conducted a field study of outdoor advertising along the city expressway, in which subjects follow a predetermined path. Upon their return, participants completed a short questionnaire that included road advertising rates. He also allowed participants to watch video scenes in the city, including seven outdoor ads that had been taken in advance, and asked if the subjects would recognize all seven outdoor ads. They then completed a second questionnaire, including whether or not the participants have a positive opinion towards outdoor advertising, and so on. In other words, Wilson (2015) conducted two questionnaires with the same participants: the first questionnaire contains questions about the brand image of the advertised companies, and the second questionnaire contains questions about whether or not consumers have a positive opinion on outdoor video advertising. The results show that corporate color is positively associated with the recognition of four corporate color ads: Apple, Western Digital, Y! On the other hand, corporate color has no significance in recognizing three corporate color ads: Panasonic, Capcom, and Sakai Construction. H1 consumers are therefore more likely to recognize ads when they use corporate colors supported by the advertised company, and when consumers know what the color is. In addition to normal factors, outdoor advertising is also affected by a large number of internal factors. Grigaliunaite (2019) conducted research aimed at establishing criteria for internal factors influencing the effectiveness of outdoor advertising. The criteria chosen were the font size of the title, the number of elements in the ad, and the dominant elements in the ad. The main research results show that when the surface size of visual and text outdoor advertising is the same, the text elements attract more visual attention than visual advertising. Ads that contain a large number of elements attract more visual attention than those that contain a small number of elements (Grigaliunaite, 2019). The prices of billboards have not changed

much since the 1990s. Billboard space in a good location with nice visibility costs 5 to 6 thousand CZK. To these costs, the price for the graphic design and printing of the poster itself must be added. The price of the entire campaign is then easily calculated according to the number of spaces on which we have our advertisement put. The price of the billboard space is determined by several aspects. The most important thing is the attractiveness of the area - i.e. its location, proximity to a busy road, high throughput of vehicles and at the same time the abundance of pedestrians. The visibility of the area is also crucial. The billboard must be ideally rotated so that the driver has a perfect view of it. It should be perpendicular to the road or horizontally on the other side of the road. Logically, free-standing billboards attract more attention. There are 6 methods for determining the price of outdoor advertising (cost, demand, based on competition, according to the perceived value by the customer, detailed point method, document analysis)

2 Data and methods

2.1 Data

To achieve the aim of the paper, it is necessary to ask the following research questions:

1. What are the current trends in outdoor advertising?
2. To what extent does the price of outdoor advertising differ within the regions of the Czech Republic?
3. How different is the price between normal and outdoor advertising?

To answer the first research question, we will conduct a questionnaire survey. We will use the CAWI method. The CAWI method is a technique of gathering information in quantitative market surveys and public surveys in which the respondent is asked to complete the survey electronically. I will give the questionnaire to approximately 100 respondents. We will ask questions both in smaller cities and in larger ones, because, for example, there are more billboards in larger cities than in smaller ones. In smaller cities, a different type of outdoor advertising predominates. We will include both younger and older respondents in the questionnaire survey, because the older generation has a different view of outdoor advertising than the younger generation and vice versa. We process the data we obtain in Microsoft Excel. From the developed data, we will create a clear pie chart to show what the respondents consider to be the biggest trends in outdoor advertising and which outdoor advertising most often appears in cities. We decided on the pie chart because it is the most readable.

The data to determine the answers to the second research question will be obtained from the website plakatov.cz. We will evaluate the data from this website in Microsoft Excel software. From each region in the Czech Republic, we will determine the average price of outdoor advertising. We will create a map from the average prices we find in the application using Microsoft Excel. We will draw the map in PowerBi. For the map to display correctly in PowerBi, we need to put the data in the right places. In the location section, we put in regions. We will list the price of the billboards from each region in the Legend section. If we do everything correctly and enter the data in the right places, we will obtain a clear map of the outdoor advertising prices of each county. Below the map, we will add a legend noting the number of outdoor advertisements there are in each region, because the number varies greatly.

We obtain the data to answer the last question by finding the price of advertising on the most popular TV stations. From the data we get, we calculate an average price of TV advertising. For the average price of advertising, we express the highest price and the lowest price. We will utilize statistical functions and minimum and maximum to perform this task. We will also express the modus. With the modus, people will know what price is used most often. We will also calculate the average of the outdoor advertising prices. For the average price of outdoor advertising, we will also express the highest and lowest price.

We will also express the modus here. Then we compare the average prices of TV and outdoor advertising.

2.2 Methods

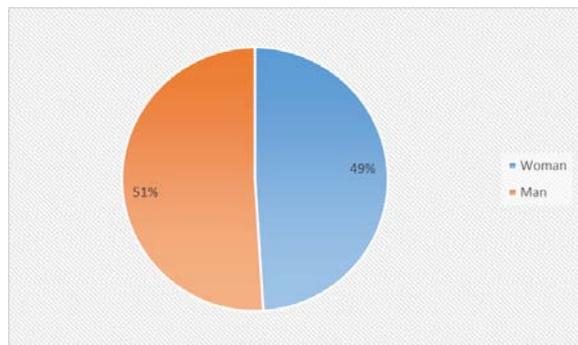
A suitable method for determining the price of outdoor advertising would be to analyse documents (price lists). We have decided to compare how the price of outdoor advertising varies in different regions or districts. To find out the factors that affect the price of outdoor advertising we will need to know the composition of outdoor advertising. It will also be interesting to compare the price of outdoor advertising and television advertising. To evaluate the data, we will choose the method of comparison. For the first question we will choose the questionnaire survey method. For the last question we will choose the analysis of the price list of individual TV stations (Česká televize, Nova, Prima) and quantile analysis. Quantile analysis is an analysis that divides the set of observations and separates the number of highest and lowest values. Using this analysis we will find the lowest price of an advertisement, the highest price of an advertisement, the modus (the number that occurs most often in a set of data).

3 Results

What are the current trends in outdoor advertising? The questionnaire survey was completed by 100 respondents. The questionnaire survey was completed by respondents from larger and smaller cities. 52% of respondents were from larger cities, such as Prague, Pilsen, České Budějovice. 48% of respondents were from smaller villages.

As shown in Figure 1, 51% of respondents were men and 49% were women.

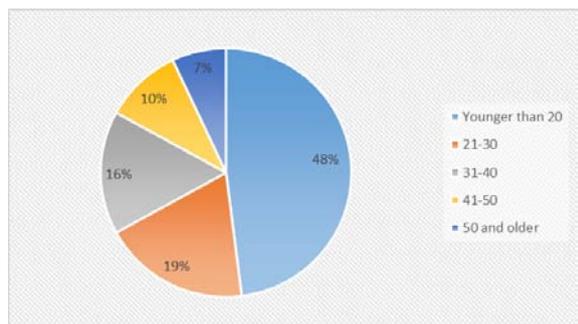
Figure 1: Respondents' gender



Source: Authors.

Figure 2 shows that the respondents were of different age categories: 48% of the respondents were younger than 20 years old, 19% of the respondents were 21-30 years old, 16% of the respondents were 31-40 years old, 10% of respondents were 41-50 years old and 7% of respondents were more than 50 years old.

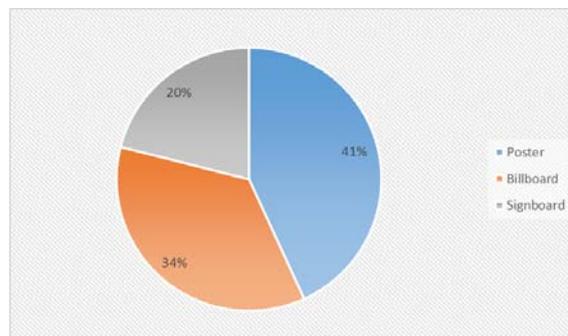
Figure 2: Respondents' age category



Source: Authors.

Figure 3 shows us the most seen types of outdoor advertising. Respondents most often see Posters. Posters are most often seen by 43% of respondents. Subsequently, they often see billboards. 36% of respondents see billboards the most. Signboards are the least seen. They are only seen by 21% of respondents.

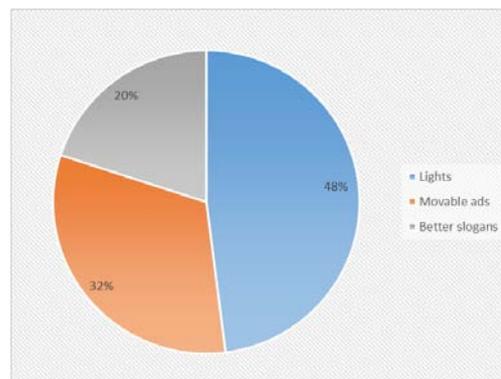
Figure 3: The most seen types of outdoor advertising



Source: Authors.

Figure 4 shows us the biggest trends in outdoor advertising. Respondents see the biggest trends in lighting (48%). Subsequently, they see a big trend in movable advertising (32%). They see another trend in better slogans (20%).

Figure 4: Biggest trends in outdoor advertising



Source: Authors.

To what extent does the price of outdoor advertising differ within regions in the Czech Republic? The price of outdoor advertising does not differ much within the regions in the Czech Republic. We created a table (Table 1) and a map (Figure 5) to find out how much outdoor advertising costs, in which region and how many advertisements are located in each region.

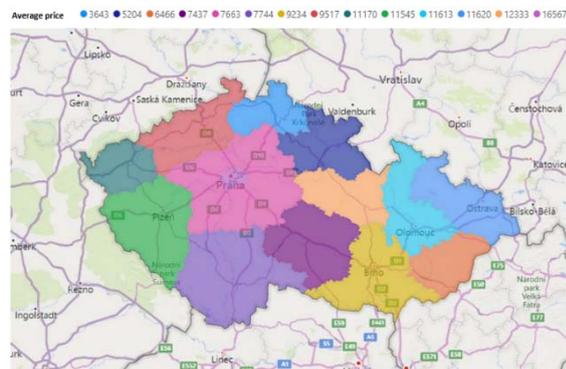
Table 1: Price and number of outdoor advertisements in individual regions

Region	Average price (in CZK)	Number of outdoor advertisements
Jihočeský region	7,744	42
Jihomoravský region	9,234	79
Karlovarský region	11,170	29
Vysočina region	7,437	38
Královehradecký region	5,204	30
Liberecký region	3,643	50
Moravskoslezský region	11,620	94
Olomoucký region	11,613	73
Pardubický region	12,333	18

Plzeňský region	11,545	34
Prague	16,567	174
Středočeský region	7,663	63
Ústecký region	9,517	93
Zlínský region	6,466	18

Source: Authors.

Figure 5: Average price of outdoor advertising in individual regions



Source: Authors.

What factors influence the price of outdoor advertising compared to television advertising? We found out the price of television advertising of the three most popular channels: Nova, Prima and Česká televize.

Figure 6 shows the seasonal indices of Česká televize. Česká televize has the lowest advertising price in January and July. The price of advertising in January and July is CZK 21,600. On the contrary, the highest price of advertising is in December. In December, the price of advertising is CZK 58,050.

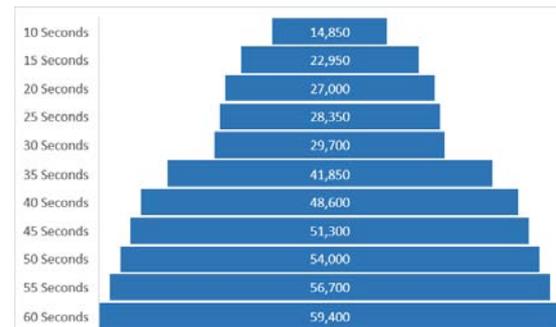
Figure 6: Seasonal indices of Česká televize



Source: Authors.

In Figure 7 we can see the timeframe indices of Česká televize.

Figure 7: Timeframe indices of Česká televize



Source: Authors.

Figure 8 shows the price of advertising in each month on Prima. Prima has the lowest advertising price in January and July. The price of advertising in January and July is CZK 12,418. The highest price of advertising is in December. In December, the price of advertising is CZK 33,374.79.

Figure 8: Seasonal indices of Prima



Source: Authors.

Figure 9 depicts the timeframe indices of Prima.

Figure 9: Timeframe indices of Prima



Source: Authors.

In Figure 10 we can see the price of advertising in individual periods on the TV channel Nova. The lowest price of advertising on Nova is in January. In January, the price of advertising is CZK 17,608.08. The highest price of advertising is in December. In December, the price of advertising is CZK 54,081.96.

Figure 10: Seasonal indices of Nova



Source: Authors.

Figure 11 shows the timeframe indices of Nova.

Figure 11: Timeframe indices of Nova



Source: Authors.

4 Discussion

Based on the obtained results, we are able to answer research questions which we determined earlier:

1) "What are the current trends in outdoor advertising?"

The questionnaire survey showed that the most seen type of outdoor advertising are posters, billboards and signboards. In Figure 3, we can see that posters are seen the most by 40% of respondents, billboards by 29% of respondents, and signboards by 18% of respondents. Figure 4 shows us current trends in outdoor advertising. Respondents noted the biggest trends are in lighting, movable advertising and better slogans. Lighting was the answer chosen by 42% of respondents, mobile advertising by 25% of respondents and better slogans by 15% of respondents.

2) "To what extent does the price of outdoor advertising differ between regions in the Czech Republic?"

What matters most is how big the city in which the outdoor advertising is located is. Larger cities have a larger number of outdoor advertisements, in smaller cities or villages, on the other hand, we do not encounter outdoor advertising very often. The prices of outdoor advertising are the same in each region, but it depends on how many ads are in the region for the lowest price and how many for the highest. The results show that the cheapest outdoor advertising is in the Liberec region, where the average price is 3,643 CZK, while the most expensive outdoor advertising is located in Prague, where it is also located most frequently, specifically here we can find 174 outdoor advertisements. The average price of outdoor advertising here is CZK 16,567. On the contrary, outdoor advertisements are least prevalent in the Zlín Region. There are 18 of them in the Zlín Region and the same number of outdoor advertisements can also be found in the Pardubice Region. The difference in outdoor advertising between the Zlín and Pardubice regions is mainly in regard to the price. In the Zlín Region, the average outdoor advertising costs CZK 6,466, while in the Pardubice Region the

price is significantly more expensive. The average price for a similar advertisement here is CZK 12,333.

3) "How different is the price between normal and outdoor advertising?"

We analyzed the price lists of individual television stations (Nova, Prima, Česká televize) to find out the price of advertising of individual stations. In the analysis, we focused on sixty-second television advertising and its development throughout the year. To find out the price of a television ad, we need to know the cost per rating point (CPP). When we find out the cost per rating point, we multiply the seasonal and timeframe indices for the individual period by this price, and after adding the seasonal and timeframe indices, we get the advertisement cost of individual stations.

The results show that the best price for television advertising is on the TV station Prima. The price of a 60-second television commercial on this station will cost CZK 459,792 per year. The highest price of advertising on Prima is in December, when its average price reaches CZK 33,375. On the contrary, the lowest price of advertising is in January (CZK 12,418). The modulus of Prima (the most frequent price of advertising) is CZK 21,732. Nova has an affordable price for television advertising. The price of a TV commercial on Nova will cost CZK 725,703. The highest price of television advertising on Nova is also in December, when the price of television advertising is CZK 54,082, while the lowest price is in January, in the amount of CZK 17,609. The modulus of Nova is CZK 35,216. Česká televize has the least acceptable price for television advertising. The price of a television advertisement on Česká televize will cost CZK 849,150. As usual, the highest prices here are achieved by television commercials in December (58,050 CZK) and the lowest in January (21,600 CZK). The modulus of the price of advertisements on Česká televize is CZK 39,150 ČT.

We analyzed the price lists of individual television stations (Nova, Prima, Česká televize) to find out the price of advertising of individual stations. In the analysis, we focused on sixty-second television advertising and its development throughout the year. To find out the price of a television ad, we need to know the cost per rating point (CPP). When we find out the cost per rating point, we multiply the seasonal and timeframe indices for the individual period by this cost, and after adding the seasonal and timeframe indices, we get the advertisement price of individual stations.

In determining the price of a television advertisement, it plays a very important role in which month we want the advertisement to be broadcast and how long it should be. Compared to the prices of TV advertising, the prices of outdoor advertising per year are more advantageous.

The lowest price of outdoor advertising is in the Liberec Region, where we pay an average of CZK 43,176 per year. On the contrary, the highest price of outdoor advertising can be found in Prague, where the average annual price climbs to CZK 198,804.

The results will be beneficial for people who are interested in outdoor advertising. They will be most beneficial for outdoor advertising producers to know their standing compared to their competition and other regions.

5 Conclusion

The aim of the paper was to find out how the price of outdoor advertising varies in the Czech Republic. From the plakatov.cz website, we found out the prices of outdoor advertising in individual regions in the Czech Republic. We analyzed the prices of outdoor advertising from individual regions using Microsoft Excel software and calculated the averages of outdoor advertising prices in individual regions. Therefore, the aim of the paper was achieved.

The price of outdoor advertising is the same in each region. It depends on how many outdoor advertisements a region offers at

the lowest price and how many at the highest price. Another important role is played by the size of the city. In a smaller city, there is a smaller number of outdoor advertising, in a larger city there is a larger number of outdoor advertisements. The cheapest outdoor advertisement is located in the Liberec region. Here, the price of outdoor advertising is CZK 3,643. On the contrary, the highest price of outdoor advertising is in Prague. Here, the average price of outdoor advertising is CZK 16,567. The lowest number of outdoor advertisements is located in the Pardubice and Zlín regions. There are 18 outdoor advertisements in these regions. The difference between outdoor advertising in the Zlín and Pardubice regions is in the price. In the Zlín Region, an average of outdoor advertising costs CZK 6,466. In the Pardubice Region, outdoor advertising costs an average of CZK 12,333. On the other hand, most outdoor advertising is located in Prague.

The results above lead to the following question -what are the biggest advantages and disadvantages of outdoor advertising? What kind of outdoor advertising is most common in the Czech Republic? How does the price of outdoor advertising in the Czech Republic differ from neighboring countries? Based on the data we have collected for this research, we are unable to answer these research questions. Therefore, it would be appropriate to carry out follow-up research to answer these and other emerging questions.

Literature:

1. Batoool, S., Iqball, R.: Impact of green advertising on consumer purchase behavior. *International Interdisciplinary Journal of Scholarly Research*. 2016, 2(1). ISSN 2412-303X.
2. Belov, A., Ramov, Y.: Approach for increasing the adaptability of digital outdoor advertising. *2020 IEEE International IOT, Electronics and Mechatronics Conference (IEMTRONICS)*. 2020, 1-5 p.
3. Bylinskiy, Z., Nam, W., Kim, et al.: Learning visual importance for graphic designs and data visualizations. *30th Annual ACM Symposium on User Interface Software and Technology*. 2017, 57-69 p.
4. ČT: Ceník pro televizní vysílání reklamy v České televizi [Price list for television broadcasting of advertising on Czech Television]. *Česká televize*. 2021 [online]. Prague, Česká televize 2021 [cit.2021-5-20]. From: <https://www.ceskatelevize.cz/vse-o-ct/reklama/televizni-reklama>
5. Dulebement, M., Moses, R.: The highway beautification act: towards improving efficiency of the federal outdoor advertising control program. *Transportation Research Part A: Policy and Practice*. 2018, 110, 88-106 p. ISSN 0965-8564.
6. Grigaliunaite, V., Pileliene, L.: Arvydas Petras. The analysis of the influence of internal factors on outdoor advertising effectiveness. *Research for Rural Development 2016: Annual 22nd International Scientific Conference Proceedings*. 2016, 166-173 p.
7. He, Y., Xinshuo, Z., Li, Q., Rouyi, M., Young, C., Jingfeng, X., Zhen, T.: Influence of coloured light projected from night-time excessive luminance outdoor LED display screens on vehicle driving safety along urban roads. *Building and Environment*. 2021, 188. ISSN 0360-1323.
8. Huang, M., Zhixiang, F., Weibel, R., Zhang, T., Huang, H.: Dynamic optimization models for displaying outdoor advertisement at the right time and place. *International Journal of Geographical Information Science*. 2021, 35(6), 1179-1204 p. ISSN 1365-8816.
9. Hyman, M., Parvathi, J., Omar, W.: Advertising and the impact on stock price accuracy. *Journal of Corporate Accounting & Finance*. 2021, 32(2), 90-101 p. ISSN 1044-8136.
10. Chakraborty, S., Sumanta, B., Saibal, R., Megha, S.: Advertisement revenue management: determining the optimal mix of skippable and non-skippable ads for online video sharing platforms. *European Journal of Operational Research*. 2021, 292(1), 213-229 p. ISSN 0377-2217.
11. Chytrý, M.: MojeBillboardy [MyBillboards]. Olomouc, *Project promotion* [online]. 2021 [cit.2021-21-5]. From: <https://www.mojebillboardy.cz>
12. Iqball, R., Batoool, S.: Impact of billboard advertisement on customer buying behavior: a study on Islamia University of Bahawalpur (IUB). *International Interdisciplinary Journal of Scholarly Research*. 2016, 2(1), 9-15 p. ISSN 2412-303X.
13. Lesser, L., Zimmerman, F. Cohen, D.: Outdoor advertising, obesity, and soda consumption: a cross-sectional study. *BMC Public Health*. 2013, 13(1), 1-7 p. ISSN 1471-2458.
14. Maksimenko, S., Tkach, B., Lytvynchuk, L., Onufrieva, L.: Neuro-psycholinguistic study of political slogans in outdoor advertising. *Psycholinguistics*. 2019, 26(1), 246-264 p. ISSN 2309-1797.
15. Masařová, K.: *Billboard - součást outdoorové reklamy, aneb, Žijeme v džungli [Billboard - part of outdoor advertising, or, we live in the jungle]*?1st ed. Prague: Key Publishing, 2014. 154 p. ISBN 978-80-7418-206-8.
16. Palmer, G., Green, M., Boyland, E., Vasconcelos, Y. S. R., Savani, R., Singleton, R.: A deep learning approach to identify unhealthy advertisements in street view images. *Scientific Reports*. 2021, 11(1). ISSN 2045-2322.
17. Panhwar, M., Memon, K. A., Abro, A., Deng, Z. L., Khuhro, S. A., Memon, S.: Signboard detection and text recognition using artificial neural networks. *2019 IEEE 9th International Conference on Electronics Information and Emergency Communication (ICEIEC)*. 2019, 16-19 p.
18. Park, J., Lim, T., Yang, K. H., Ju, S., Jeong, S. M.: Dipping-press coating method for retaining transparency and imparting hydrophobicity regardless of plastic substrate type. *Polymers*. 2021, 13(3), 1-10 p. ISSN 2073-4360.
19. Permana, H., Safa, H., Fauzi, B.: Augmented reality in poster: Introduce sir Isaac Newton in the study of mechanics. *9th National Physics Seminar 2020*. 2021.
20. Plakatov, 2018. Outdoor reklama – ceny [Outdoor advertising – prices]. *Plakatov.cz* [online], 2018. Prague, Bigmedia, spol. From: www.plakatov.cz
21. Prima: Příloha k smluvním obchodním podmínkám pro smlouvy o vysílání obchodních sdělení v TV programech zastupovaných FTV PRIMA, s.r.o. [Annex to the contractual terms and conditions for contracts on the broadcasting of commercial messages in TV programs represented by FTV PRIMA, s.r.o.]. *Prima*. 2021 [online]. Prague, Prima FTV 2021 [cit.2021-5-20]. From: https://www.iprima.cz/sites/default/files/article/cenik_vop_tv_ftv_prima_2017.pdf
22. Rodero, E.: Do your ads talk too fast to your audio audience? How speech rates of audio commercials influence cognitive and physiological outcomes. *Journal of Advertising Research*. 2020, 60(3), 337-349 p. ISSN 0021-8499.
23. Tsuji, R.: What Factors Make Outdoor Advertising More Effective. *Kansai University*. 2017.
24. Vysekalová, J., Mikeš, J.: *Reklama: jak dělat reklamu [Advertising: how to make an advertisement]*. 4th ed. Prague: Grada. 2018. ISBN 978-80-247-5865-7.
25. Zhang, P., Bao, Z., Li, Y., Zhang, Y., Peng, Z.: Towards an optimal outdoor advertising placement: when a budget constraint meets moving trajectories. *ACM Transactions on Knowledge Discovery from Data*. 2020, 15(5). ISSN 1556-4681.

Primary Paper Section: A

Secondary Paper Section: AH, AE

DOES THE IMPLEMENTATION OF LOYALTY PROGRAMMES LEAD TO GAINING A LOYAL CUSTOMER?

^aMICHAELA ŽILINSKÁ, ^bJAROMÍR VRBKA, ^cEVA KALINOVÁ

^a*Institute of Technology and Business in České Budějovice, School of Expertness and Valuation, Okružní 517/10 37001 České Budějovice, Czech Republic*

^b*Institute of Technology and Business in České Budějovice, School of Expertness and Valuation, Okružní 517/10 37001 České Budějovice, Czech Republic*

^c*University of Žilina, The Faculty of Operation and Economics of Transport and Communication, Department of Economics, Univerzitná 8215/1, 01026 Žilina, Slovakia*

email: ^amzilinska@mail.vstecb.cz, ^bvrbka@mail.vstecb.cz, ^ckalinova@mail.vstecb.cz

Abstract: An increasing number of retailers and service providers are aware of the importance of loyalty programmes as a tool to support sales. The aim of this paper is to evaluate the benefits of loyalty cards for sales support at three selected companies in the Czech market, especially Kaufland, Globus and Tesco, and to determine whether the implementation of the loyalty programme leads to gaining a loyal customer. The basic source of data is the data obtained through an interview and the CAWI method, which consists in collecting data using an online questionnaire survey. The obtained data are evaluated using a prognostic marketing and comparison method. In total, responses were obtained from 121 respondents. The results of the research show that the implementation of loyalty programmes does not lead to gaining a more loyal customer. If the customer does not have to register to join the programme, he does not perceive himself as loyal to the brand. The Kaufland Card programme has become the most used loyalty programme. These conclusions lead to new ideas that could affect both the future development of loyalty programmes and their structure.

Keywords: customers, retail chains, benefits, loyalty, loyalty programme, loyalty cards

Introduction

Today, more and more companies are coming to the market and their competitive environment is constantly growing. A limited number of customers can be considered one of the most handled problems of these companies. For this reason, it is essential for companies to emphasize the satisfaction and care of each of their customers, because they are irreplaceable sources of income for companies. If customers are satisfied, then they tend to return and buy more goods than dissatisfied customers. Over time, satisfied customers become permanent customers. If the customer is satisfied, his or her purchases are repeated and thus ensure a stable turnover for the company due to the fact that they no longer need to look for discounts but are willing to buy the product from the company without being at a discount.

The current trend for retailers is loyalty cards as a form of sale. A strong motivation for handling this issue is the fact that thanks to a satisfied customer the company gains a better position in the market and thanks to this a precondition is created to ensure long-term existence (Zamazalová, 2008; Klieštík et al., 2020).

Loyalty programmes serve to strengthen relationships with customers, for example through direct discounts or special rewards (Bijmolt and Verhoef, 2017). Loyalty cards provide retailers with the means to help them identify a particular customer and to collect customer-specific data, enabling individualized marketing (Perez et al., 2020).

We live in a time when new communication technologies are developing at an incredible speed, especially easier communication between retailers and their customers. Due to the strong competitive environment, it is important that companies pay attention to the marketing tools that will serve to support their sales. Retaining a new customer is not easy and at the same time it is very expensive, so investing in these programmes pays off to the companies. With these programmes, they can attract new customers to their side in the long run.

The goal of this seminar thesis is to evaluate the benefits of loyalty cards for sales support at three selected companies in the Czech market, especially Kaufland, Globus and Tesco and to determine whether the implementation of the loyalty program

leads to gaining a loyal customer. In order to meet the goal, the following research questions were formulated:

RQ1: What factor most influences the customer's shopping behaviour?

RQ 2: Does the implementation of the loyalty programme lead to gaining a loyal customer?

RQ3: Why do customers become members of loyalty programmes?

RQ4: What is the attitude of customers to loyalty programmes?

RQ5: Which loyalty programme is the most used among customers?

1 Literature review

Zakaria, Rahman and Othman (2012) claim that the economic crisis after 2008 has significantly increased the entrance of new businesses into the consumer market, thus significantly increasing competition in this type of market. Therefore, a large part of retailers has introduced the so-called LP (loyalty programme), which serves mainly to maintain customer loyalty, and thus to prevent the customer's switching to a competitor. Loyalty programmes, such as the predominant CRM (Customer relationship management) strategies, are intended to strengthen customer loyalty and thus ensure the company's long-term profitability (Gandomi and Zolfaghari, 2013). These programmes are intended not only to help meet the company's goals, but also to serve as a valuable source of information that will help to communicate with customers better and also to build rewards (Tahal and Střiteský, 2014). Chaudhuri, Voorhees, and Beck (2019) examined the extent to which the introduction of LP can increase both fixed sales and gross profit. They took advantage of the fact that they had been provided 322 data from publicly traded companies and concluded that the introduction of LP can increase sales and gross profits in the short term (during the first year) and these positive effects are maintained in the long term (for at least three years).

However, one of the most discussed topics is customer loyalty. Noskova and Romanova (2015) found that the basic factor influencing customer loyalty is in the context of the 7P marketing mix (product, price, location, promotion, staff, physical evidence, and process) and states that the main factors influencing customer loyalty formation in retail chains are mainly rational (product, price, location, staff), regardless of the format of retailers. Omar et al. (2011) collected data from 400 loyalty programme cardholders and concluded that programme satisfaction is not related to trade loyalty, however, they argue that loyalty plays a crucial role in the relationship between programme satisfaction and trade loyalty.

Today's companies pay the most attention to acquiring new customers, so they lose interest in existing customers and neglect them, even though they generate up to 90% of their income. They spend up to 70% of marketing budgets on this, and as a result, retailers lose 10 to 30 percent of existing customers each year (Zamazalová, 2008). Many companies rely on LPs and are relatively successful in recruiting new members but are unable to attract them in the long run (Bruneau, Swaen, and Zidda, 2018). Customers refuse to accept a new loyalty card if they have difficulty understanding and learning how the loyalty card works and if they do not perceive it as easy to use (Demoulin and Zidda 2009). Paulssen, Brunner and Sommerfeld (2019) were the first to empirically test customer behaviour in and out of the retail environment and advise managers intending to invest in customer incentives (providing constructive feedback on products or services) to invest in activities based on customer identity.

Today, most customers own several loyalty cards from competing retailers. Demoulin and Zidda (2008) examined the impact of loyalty card ownership on loyalty and concluded that loyalty programmes are effective only when customers value the

rewards associated with them and confirm through analysis that when cardholders are satisfied with the rewards programme, they are more loyal and less sensitive to the price advantage of the competitors than dissatisfied cardholders. Users feel the need to stay in the loyalty system and collect points to earn rewards that may not be very interesting to them most of the time (Sönmeztürk, Ayav and Erten, 2020). Dorotic et al. (2014) who examined the impact of rewards on members' behaviour, also identify with this topic. They concluded that companies should not put pressure on using and expiring of points and let members choose when and how many points they want to use in order to improve their shopping behaviour.

Murugan, Prasad and Mageh (2014) examined LP using factor analysis and found that quality, added value, comfort and user-friendliness positively affect overall customer satisfaction with the loyalty programme.

To fulfil the goal and answer the research questions, the CAWI method (Computer Assisted Web Interviewing) will be chosen, and a comparative and prognostic marketing method will be used for data processing and evaluation.

2 Data and methods

2.1 Data

For research, we will collect individual data using the CAWI method. The CAWI method consists in collecting data using an online questionnaire survey. The questionnaire will be created using the Survio.com website and will contain 20 time-saving anonymous questions. We will choose this server mainly due to its low cost and clear processing of results. The questions will be aimed at a group of people from the age of 18 and will mainly concern the use of loyalty cards, shopping behaviour and customer preferences. The questions will be of the single and multiple-choice type (one or more options). For some questions, the answer will be directly determined, for others it will be necessary for the respondents to write their own answer. We will post the finished questionnaire on social networks using a web link, which, after clicking on it, will make the questionnaire available to the respondents. In the questionnaire, we will focus on three selected retail chains, namely Kaufland, Tesco and Globus. We will also conduct an interview with the company whose programme will be most used among customers. We will ask the company questions about the time required to create a loyalty programme. We will also try to find out what costs had to be, what benefits the company plans to enrich the loyalty programme with, whether sales and numbers of customers increased after the launch of the loyalty programme, what the company expected from the launch of the loyalty programme and what the customer reaction was.

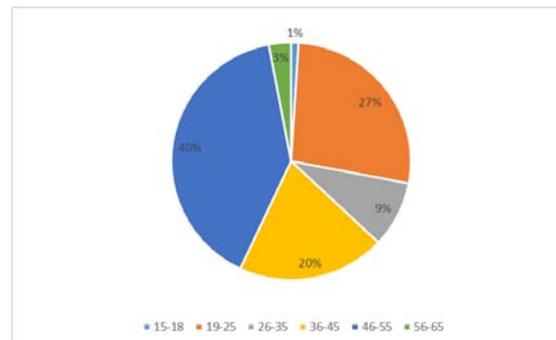
2.2 Methods

Data will be obtained from at least 100 respondents. The obtained data will be downloaded. The next step will be to edit and delete irrelevant data. The adjusted data will be evaluated both qualitatively and quantitatively. The questionnaire will be evaluated using statistical methods. We will use frequencies, especially absolute (specific number) and relative (it expresses the representation of a specific value in the total and is expressed as a percentage). We will calculate relative frequencies by dividing the absolute frequency by the total number of values. We will evaluate the data using a comparative and marketing forecasting method. The comparison method will consist of comparing data sets and finding out how the files differ and how they resemble. Using the marketing forecasting method, we will try to track and estimate their future course from the provided data and find key factors that can affect this course. The resulting data will be published in both graphical and written form.

3 Results

There are 121 respondents for each question. The ratio of men to women is 60.3% to 39.7%. As shown in Graph 1, the predominant group of respondents was aged 46-55, representing 39.7%. Another big group of 27.3% is the group of people aged 19-25 years. The last big group of 19.8% is the group aged 36-45 years. On the other hand, the least represented group is the group aged 26-35 years => 9.1%, then 56-65 years in the representation of 3.3% and 15-18 years => 0.8%. There was no representation in the other groups. Respondents are mostly employed, entrepreneurs or students, in the total representation of 86.8%. The others are either unemployed or retired 13.2%.

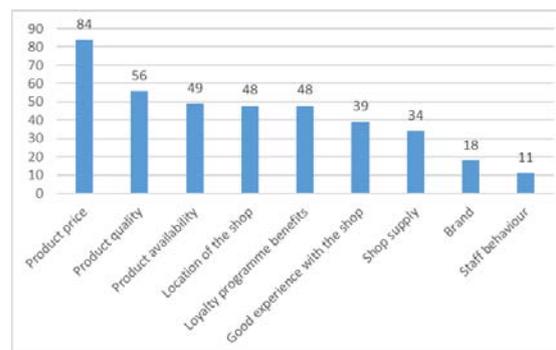
Graph 1: Age of respondents



Source: Authors.

Regarding the shopping behaviour shown in Graph 2, respondents most often make decisions based on the following factors: product price 69.4%, product quality 46.3%, product availability 40.5%, location of branches and loyalty programme benefits 39.7%, good experience with the shop 32.2%, shop supply 28.1%, brand 14.9% and staff behaviour 9.1%. For this question, it should be noted that respondents had a choice of multiple answers. During one visit to the retail store, customers are willing to pay: CZK 500-1,000 => 54.5%, CZK 0-500 => 28.1%, CZK 1,000-2,000 => 14%, CZK 2,000-3,000 => 2.5%, more than CZK 3,000 0.8%.

Graph 2: Factors influencing customer decisions

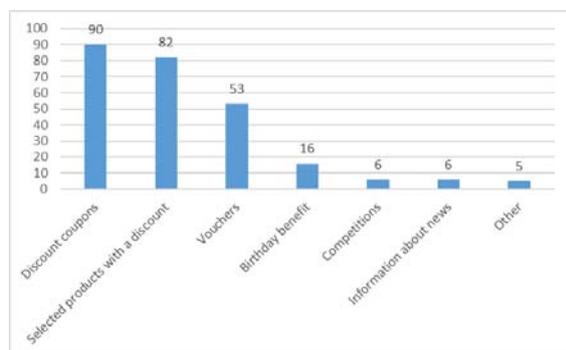


Source: Authors.

According to the evaluation, Kaufland becomes the most visited chain, with a total share of 57%. Globus came in second with 38% and Tesco came in third with 25.6%. 21.5% of respondents visit other chains. Here again, it should be noted that it was a question of multiple choice. Only 18% of respondents are loyal to one chain, the remaining 82% are not loyal to any retail chain. 54.5% of respondents are members of the Kaufland Card loyalty programme, 45.5% are members of the Tesco Clubcard programme and 42.1% are members of the Globus Bonus programme. 14.9% are not members of any of the offered programmes. Again, it should be noted that this was a multiple-choice question. According to the respondents, the main reason for entering the loyalty programme was the possibility of

obtaining discounts, for example in the form of a discount coupon, as well as the possibility of using scanners. Some respondents enter the programme automatically when they find out about it. Of the members of loyalty programmes, only 16.5% of respondents feel that they know most of the benefits. 59.5% have a basic awareness and the remaining 24% do not know them at all. Respondents within the benefits of the loyalty programme most prefer the option of a discount coupon of 74.4%, selected products with a discount of 67.8% and vouchers 43.8%. On the contrary, the least preferred benefits are birthday benefits 13.2%, competitions and information about news 5%. 4.1% of respondents prefer other benefits, everything is shown in Graph 3. 36.4% of respondents use the benefits of the loyalty programme weekly, 19.8% use them more often than once a month, 19.8% (again) of respondents use the benefits once a month, 14.9% of respondents use the benefits several times a year and 9.1% of the respondents do not use any benefits.

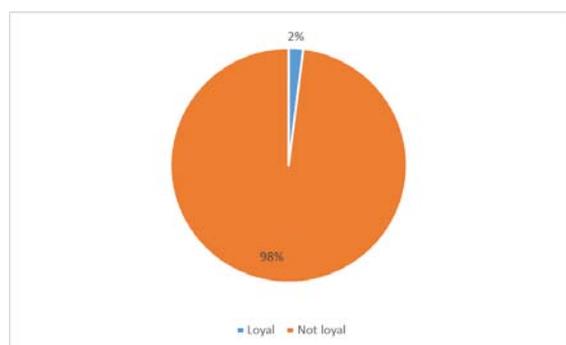
Graph 3: Preference of benefits



Source: Authors.

10.5% of respondents started shopping more in the chain after entering the loyalty programme, or they spend more money there, 89.3% did not change their shopping behaviour. 1.7% of respondents started to be loyal to only one chain after establishing a loyalty card, the remaining 98.3% are not loyal, see Graph 4. Regarding the use of established loyalty cards, 41.3% use only a part of them, 35.5% use only one, 16.5% use all and 6.6% do not use any.

Graph 4: Respondents' loyalty to one chain after establishing a loyalty programme



Source: Authors.

According to the respondents, the main disadvantages of loyalty programme membership include the provision of personal data, the loss of loyalty points, the lack of clarity of benefits, the constant questioning of saleswomen about a loyalty card and the excessive number of cards in the wallet. Respondents would enrich the loyalty programmes with the following benefits: scratch cards, 1 + 1 product for free, cashback, setting up loyalty cards without the necessary registration, every 100th purchase with a 50% discount, sharing one account within one family and keeping receipts. According to the respondents, the most used loyalty programme is Kaufland Card with 45%, Tesco Clubcard

is in the second place with 18% and Globus Bonus is in the last place with 16%. 21% of respondents are members of other loyalty programmes.

4 Discussion

Based on the obtained results, we can answer research questions that were set in the introduction. In total, answers were obtained from 121 respondents, which in comparison with the customer bases of these chains in the Czech Republic is really only an indicative sample. Using the first and last three questions, we mainly tried to profile the respondent and find out more about his purchasing decision-making process. We were interested in their gender, age, how often he or she visits the retail chains and what criteria are crucial for him or her when choosing a retail chain (the reason could have been the loyalty programme). Furthermore, what amount of money they spend on average during one visit to retail chain and to which group they belong (student, worker, pensioner, etc.). Questions 4 and 5 examined the attendance of three selected retail chains (Kaufland, Globus, Tesco), although it was possible to choose the option "none of the options offered" and customer loyalty to only one brand. Using the following twelve questions, we directly monitored the use and evaluation of selected loyalty programmes (Kaufland Card, Globus Bonus, Tesco Clubcard). The majority of open-ended questions can be found in this part of the questionnaire because we did not want to limit the respondents only to the options we selected, and we also wanted to give them the opportunity to express their opinion.

Due to the large representation of women, it can generally be said that the representatives of the fairer sex were much more communicative in open answers than men, so we were able to get much more information about them. The first research question focuses on which factor most influences the customer's shopping behaviour. At first glance, it is significant that financial factors play the largest role in decision-making. This is evidenced by the fact that respondents are willing to spend up to approximately CZK 1,000 on a single visit to a retailer. According to the evaluation, Kaufland is the most visited chain. Interestingly, however, only 18% of respondents are loyal to only one chain. Respondents who are not loyal, choose the chains because of current discount offers. Another reason is the preference of branches, which are closest to their current location and, last but not least, their decisions are influenced by the different assortment offer of chains. We were interested in what led the respondents to establish a loyalty programme, so we asked them an open question again. In addition, we got the answer to the second research question: Why do customers become members of loyalty programmes? It was not surprising that the main motivator was the possibility of saving money, especially through benefits such as discount coupons or discounts on selected products. On the contrary, the surprising and at the same time the most frequent answer of the respondents (33%) was the possibility of using shopping scanners (scan & go), with which the respondents will save time when shopping. We would like to point out that without membership in the loyalty programme, it is not possible to use scanners. However, the question remains whether the implementation of the loyalty programme helps to gain a loyal customer and the consequent greater profitability of companies. Here is the answer to the third research question: Does the implementation of the loyalty programme lead to gaining a loyal customer? The shocking result is that only 10.7% of respondents started buying more in a given chain, or spend more money there, and only 1.7% of respondents were influenced by the loyalty programme so much that after its establishment they became loyal to only one chain. As a result, the introduction of a loyalty programme does not lead to gaining a loyal customer.

The average Czech has 6 loyalty cards in his or her wallet, of which only 4 are used regularly. This is also evidenced by the fact that only 16.5% of respondents use all established loyalty cards. Here we would like to point out that most people enter the loyalty programme automatically when they learn about it. It is also important to mention the fact that for most users, the biggest

problem is the need to carry a membership card with you at all times. If they do not have it, the relevant points will not be charged to them and thus they will lose possible benefits. Respondents who are not in any loyalty programme avoid them just because of the need to own loyalty cards. Fortunately, time goes on and larger retail chains connect users to their own accounts, where they see their points, have a better overview of the benefits available, such as what bonuses they can already reach, and receive regular information about current promotions.

Loyalty programmes have a lot of advantages, but also disadvantages. Another research question asked is: What is the attitude of customers to loyalty programmes? For this reason, we asked the respondents an open question, whether they perceive any disadvantages in connection with the loyalty program, or what benefits they would enrich the loyalty program. They perceive the provision of personal data, which are necessary for registration in the loyalty programme, as the predominant disadvantage. This condition makes them feel that they are being monitored and that their privacy will, or could be, unduly infringed. Another common disadvantage is the loss of unused loyalty points. By not having time to use all the points accumulated in time, customers lose the opportunity to obtain benefits such as discounts or vouchers. Customers are being pressured in this regard and therefore do not feel comfortable in the loyalty programme. Other disadvantages chosen by the respondents include constant questioning about the loyalty card by the saleswomen, lack of clarity of benefits or excessive ownership of the cards in the wallet. Regarding the enrichment of loyalty benefits, the respondents were very creative in this regard. The most interesting idea was to introduce scratch cards for a certain amount of purchase. In these scratch cards, after scratching them, for example, there would be a chance to get a discount on another purchase or a small promotional gift. Furthermore, respondents would welcome, for example, special events where there would be a 1+1 product free, cashback, setting up a loyalty card without registration, every 100th purchase with a 50% discount, sharing one account within one family and keeping receipts.

The last and most important research question is: Which loyalty programme is the most used among customers? According to the respondents, the Kaufland Card programme became the most used loyalty programme. For this reason, we contacted Kaufland's headquarters and asked them a few key questions regarding the implementation and realization of the loyalty programme. The first question asked concerned the time required to create the programme. We received an answer that the implementation took approx. 10 months. However, this is only a figure within the Czech Republic. The overall creation of the project took more than two years and took place in Germany. In the next question, we asked how expensive the implementation of the K-card was. The cost of the programme is in the tens of millions of CZK, if we consider the development of IT infrastructure and the work of employees in Germany and the Czech Republic. However, the programme is being prepared for more countries, not only for the Czech Republic. Furthermore, what the company expected from the launch of the loyalty programme. The company expected that the customer would be more loyal, that they would be able to offer them a new benefit (the joy of shopping) and that they would be able to reward him for his loyalty in forms that would be "tailored" to him. However, the card is only a year after its creation, so they are still working on further development. We were interested in whether the number of customers and their sales increased after the launch of the loyalty programme on the market. The company replied that customer movements and market turnover are not given just by a loyalty card. They started with K-Card at a time when the Covid-19 crisis came, so separating, for example, these influences and others from customer numbers and turnover is difficult. But what the company knows is that their customer loyalty has increased. We also tried to find out whether the company plans to enrich the loyalty programme with other benefits in the future. Kaufland is planning several new card features. Customers already have the opportunity to get a discount on the entire purchase (buy it for points) - this is a

more efficient way than sending vouchers by post. And the last question asked was what the reaction of customers to the Kaufland Card was. The customer response was very positive. Customers were very interested in registering the card and taking advantage of the discounts and benefits that the card offers. Customers also use the card to shop with a K-scan, which they cannot use without a loyalty program.

The results of the research clearly show the fact that the introduction of a loyalty programme does not lead to gaining a more loyal customer. The same statement is made by Omar et al. (2011), who also argue that satisfaction with the programme is not related loyalty to the shop. Customers enter loyalty programs only because of the possibility of obtaining financial benefits. In addition, as we have already mentioned, the main motivator for the establishment is also the possibility of using scan & go shopping scanners, which customers cannot use without registering in the loyalty program. In addition, customers do not feel comfortable in loyalty programs due to pressure from retail chains and the need to provide personal information. A similar conclusion is reached by Dorotic et al. (2014), who believe that customers should not be pressured to apply loyalty points. Demoulin and Zidda (2008) argue that loyalty programs are effective only when customers value the rewards associated with them. However, I do not agree with this statement, in my opinion satisfaction with the programme and valuing the rewards is not related to loyalty to the program. In addition, most customers enter the loyalty programme immediately after the offer, without being attractive to them. For this reason, customers have 10 cards in their wallets and only use 4 of them. In our opinion, it is necessary to set the loyalty programme so that it is clear for everyone, advantageous, and also able to attract every age group.

These results can be a benefit to both retail chains thinking about implementing a loyalty programme and people who want to learn more about loyalty programs. In addition, someone can be inspired with these conclusions, or use them in other professional work

5 Conclusion

An increasing number of resellers and service providers are aware of the importance of loyalty programmes as a tool to support sales. But a simple implementation of these programmes is not enough. Its implementation must consider the costs of its implementation, the potential for building brand loyalty, integration with corporate strategy and truly beneficial benefits with added value for customers. In short, loyalty must really pay off for them.

The goal of the paper was to evaluate the benefits of loyalty cards for sales support and to find out whether the implementation of the loyalty programme leads to gaining a loyal customer. The goal was met. In the chapter of discussion, all research questions were answered. We evaluated and compared the results qualitatively and quantitatively. In the paper, we focused mainly on the use of loyalty cards and customer loyalty to retail chains. We received results that the introduction of a loyalty programme does not lead to gaining a more loyal customer. We have found that unless a customer needs to register to join the program, they do not perceive themselves as loyal to the brand. Retail loyalty programme developers should strive for simple systems that require registration that does not collect too much personal information.

The Kaufland Card programme has become the most used loyalty programme. For this reason, we conducted a short interview with the company, in order to find out more about the implementation and realization of this program.

The above results therefore lead to the following questions: Why the implementation of the loyalty programme does not help to gain a loyal customer? What needs to be done to prevent this from happening? What do customers expect from retail chains? For this reason, it is necessary to carry out follow-up research that will answer these questions and find a possible solution.

Literature:

1. Bijmolt, T. H. A., Verhoef, P. C.: *Loyalty programs: Current insights, research challenges, and emerging trends*. In: Handbook of marketing decision models. Cham: Springer, 2017. 143-165 p. ISBN 978-3-319-56941-3.
2. Bruneau, V., Swaen, V., Zidda, P.: Are loyalty program members really engaged? Measuring customer engagement with loyalty programs. *Journal of Business Research*. 2018, 91, 144-158 p. ISSN 0148-2963.
3. Demoulin, N. T. M., Zidda, P.: Drivers of customers' adoption and adoption timing of a new loyalty card in the grocery retail market. *Journal of Retailing*. 2009, 85(3), 391-405 p. ISSN 0022-4359.
4. Demoulin, N. T. M., Zidda, P.: On the impact of loyalty cards on store loyalty: does the customers' satisfaction with the reward scheme matter? *Journal of Retailing and Consumer Services*. 2008, 15(5), 386-398 p. ISSN 0969-6989.
5. Dominiguez Peres, L. J., Ibarra, L., Alejandro, G. F.: A loyalty program based on Waves blockchain and mobile phone interactions. *The Knowledge Engineering Review*. 2020. ISSN 0269-8889.
6. Dorotic, M., Verhoef, P. C., Bijmolt, T. H. A.: Reward redemption effects in a loyalty program when customers choose how much and when to redeem. *International Journal of Research in Marketing*. 2014, 31(4), 339-355 p. ISSN 0167-8116.
7. Gandomi, A., Zolfaghari, S.: Profitability of loyalty reward programs: An analytical investigation. *Omega*. 2013, 41(4), 797-807 p. ISSN 0305-0483.
8. Chaudhuri, M., Voorhees, C. M., Beck, J. M.: The effects of loyalty program introduction and design on short-and long-term sales and gross profits. *Journal of the Academy of Marketing Science*. 2019, 47(4) 640-658 p. ISSN 0092-0703.
9. Klieštík, T., Nica, E., Šuleř, P., Valášková, K.: Innovations in the company's earnings management: the case for the Czech Republic and Slovakia. *Marketing And Management of Innovations*. 2020, 3, 332-345 p. ISSN 2218-4511.
10. Murugan, A., Prasad, P. N., Mageh, R.: Factors affecting loyalty programmes and their influence on satisfaction of shoppers of organised retail stores. *International Journal of Economic Research*. 2014, 11(1), 127-138 p. ISSN 0972-9380.
11. Noskova, E. V., Romanova, I. M.: Evaluation of customer loyalty to different format retailers. *The Journal of Internet Banking and Commerce*, 2015. ISSN 1204-5357.
12. Omar, N. A., Aziz, N. A., Nazri, M. A.: Understanding the relationships of program satisfaction, program loyalty and store loyalty among cardholders of loyalty programs. *Asian Academy of Management Journal*. 2011, 16(1), 21-41 p. ISSN 1985-8280.
13. Paulssen, M., Brunner, J., Sommerfeld, A.: Customer in-role and extra-role behaviours in a retail setting: the differential roles of customer-company identification and overall satisfaction. *European Journal of Marketing*. 2019, 53(12), 2501-2529 p. ISSN 0309-0566.
14. Sönmeztürk, O., Ayav, T., Erten, Y. M.: Loyalty program using blockchain. *3rd IEEE International Conference on Blockchain*. 2020, 509-516 p.
15. Tahal, R., Střiteský, V.: Věrnostní programy a jejich vnímání zákazníky a provozovateli retailových internetových obchodů [Loyalty programs and their perception by customers and operators of retail online stores]. *Acta Oeconomica Pragensia*. 2014, 22(4), 30-41 p. ISSN 1804-2112.
16. Zakaria, I., Rahman, B. A., Othman, A. K.: The relationship between loyalty program and customer loyalty in retail industry: a case study. *2012 International Conference on Innovation Management and Technology Research*. 2012, 33-38 p.
17. Zamazalová, M.: Spokojenost zákazníka [Customer satisfaction]. *Acta Oeconomica Pragensia*. 2008, 16(4) 76-82 p. ISSN 1804-2112.

Primary Paper Section: A**Secondary Paper Section: AH, AO**

D EARTH SCIENCES

DA	HYDROLOGY AND LIMNOLOGY
DB	GEOLOGY AND MINERALOGY
DC	SEISMOLOGY, VOLCANOLOGY AND EARTH STRUCTURE
DD	GEOCHEMISTRY
DE	EARTH MAGNETISM, GEODESY, GEOGRAPHY
DF	PEDOLOGY
DG	ATMOSPHERIC SCIENCES, METEOROLOGY
DH	MINING INDUSTRY INCLUDING COAL MINING AND PROCESSING
DI	POLLUTION AND AIR CONTROL
DJ	POLLUTION AND WATER CONTROL
DK	CONTAMINATION AND DECONTAMINATION OF SOIL INCLUDING PESTICIDES
DL	NUCLEAR WASTE, RADIOACTIVE POLLUTION AND CONTROL
DM	SOLID WASTE AND ITS CONTROL, RECYCLING
DN	ENVIRONMENTAL IMPACT ON HEALTH
DO	PROTECTION OF LANDSCAPE

TEACHING GEOGRAPHICAL METHODS AND FORMS IN THE UNITED STATES, ICELAND AND SLOVAKIA

^aLUCIA PETRIKOVIČOVÁ, ^bSIMONA DYSKOVÁ,
^cMARTINA PAVLÍKOVÁ, ^dDINARA GINIYATULLOVNA
 VASBIEVA, ^eOLGA ANATOLEVNA KALUGINA

^{a,b}Constantine The Philosopher University in Nitra, Faculty of Natural Sciences, Department of Geography, Tr. A. Hlinku 1, 94974 Nitra, Slovakia; ^cConstantine The Philosopher University in Nitra, Faculty of Arts, Department of Journalism, B. Slančíkovej 1, 94974 Nitra, Slovakia; ^{d,e}Financial University under the Government of the Russian Federation, Foreign Languages Department, Leningradsky prospect 49, 125993 Moscow, Russia
 email: ^alpetrikovicova@ukf.sk, ^bsimona.dyskova@gmail.com, ^cmpavlikova@ukf.sk, ^ddinara-va@list.ru, ^ekaluginaruc@mail.ru

This work was supported by the Slovak Research and Development Agency under the Contract no. APVV-18-0185. Also, the study was carried out thanks to the international research project: Social and Innovative Platform on Cultural Tourism and its Potential towards Deepening Europeanisation (SPOT, www.SPOTprojectH2020.eu) funded by the European Commission H2020 Programme under Grant Agreement number: 870644.

Abstract: Teaching methods can be characterized as a deliberate arrangement of teaching content and activities of teacher and student, which is heading towards achievement of the educational and training objectives. The teaching form is understood as an organizational form of teaching by which the teacher implements the teaching process through various methods in different environments. Diversity of educational systems of the United States, Iceland and Slovakia predetermines the differences in teaching methods and forms. As the teaching in individual countries is quite different, the aim of this paper is to compare school education system. Iceland is currently a very popular destination for many tourists and is a compact location, for which reason we present on its example one of the outdoor teaching forms of regional landscape geography, a proposal for a geographical excursion. Its application and use is possible within the framework of interdisciplinary relations of natural as well as social sciences.

Keywords: USA, Slovakia, Iceland, geographical methods, school education system

1 Introduction

Education has been undergoing massive development from the past, with all countries, whether advanced or less developed, striving for the best possible education systems, according to their economic capacity and cultural orientation, since well-functioning education systems are an important prerequisite for the country's further development. It also leads to the globalization of education in the world, as globalization is increasingly becoming increasingly internationalized, and this causes the convergence and interconnection of education at the international level (Grežo, Petrovič, 2019). Governments are increasingly guiding the development of their own education systems based on the use of knowledge about the development of education systems in other countries. For example, it is currently an effort, in many countries, to ensure that education systems behave as part of public services.

On the other hand, education systems in the world are very specific, unique and different. Even in countries that are similar in their economic or political situations, we find many individual features. In particular, education systems are heavily dependent on historical, cultural and religious traditions.

We define the education system as "the sum of all levels, types and types of institutions that fulfill all the educational functions. At present, however, the concept of education system has a broader meaning as it not only reflects the institutional structure, but also school management and governance, the curriculum and the political, social and economic context expressed in education policy (Horák, Kolář, 2007).

2 Methodology

The first step was field research, which we attended at two elementary schools in Iceland, where we learned how Icelandic education works through personal meetings with several local

teachers. They also provided us with a wealth of materials, a textbook and a workbook to teach the local landscape. Field research has also been conducted at the Travel Agency in Iceland - D Travel and the largest accommodation company in Iceland which provides AirBnB rental for tourists in four regions of the island (capital region, western region, southwest region and southern region). Interviews with the owners of both companies were conducted in the capital of the island because of the necessary information on the state of tourism in recent years. By analyzing the information we pointed out the current state of not only education but also the tourism industry in Iceland. Using the method of collecting both electronic and print information, we chose the ones that were most important for us when writing our work. In electronic form, these were mainly Icelandic and American websites related to Iceland's education and protected areas. Printed materials were obtained through one of the local libraries in Reykjavík (Borgarbókasafnið Menningarhúsi í Reykjavík), from primary school teachers - Lækjarskóli in Hafnarfjörður and Fellaskóli in Reykjavík, and last but not least, the local population provided us with many books. The work used comparative method for comparing acquired information. We analyzed the information and phenomena to look for common and different features. We used this method to compare the school system in Slovakia, Iceland and the USA. Mathematical - statistical method was used for quantitative processing of acquired data. Thus, it was possible to accurately describe, synthesize and draw conclusions when processing statistical data. These were obtained using the databases of the Statistical Office in Iceland and the USA.

3 School education system

In Slovakia, education consists of two parts - regional education, which consists of pre - primary, primary and secondary education, and school facilities providing educational and support functions. The second part of the Slovak education system is represented by higher education, which forms a substantial part of the development and research potential of the Slovak Republic. Currently, education legislation uses the International Standard Classification of Education (ISCED) to classify education. In Slovakia, compulsory school attendance according to Act no. 245/2008 Coll. on education and on the amendment of certain acts (Education Act) for 10 years. The Constitution of the Slovak Republic provides free education at primary, secondary and university level for all citizens. There are four levels of schools in Slovakia: kindergartens, primary schools, secondary schools and colleges / universities.

The school education system in Iceland is similar to Denmark or other Scandinavian countries and consists of four levels of education. Compulsory school attendance is from 6 to 16 years old in Iceland, the school year lasts 9 months and pupils have summer holidays in June, July and August. Education is traditionally public sector oriented, and there are only a few private schools in the country. The first level is represented by kindergartens ("Leikskóli") intended for children aged two to six (Ministry of Education, Science and Culture, 2002). The kindergarten is followed by compulsory education ("Grunnskóli"). Teaching is divided into ten years. Iceland does not have lower and higher primary education, but is part of a single level of education, mostly in one building. The Icelandic education system emphasizes equality between all pupils and seeks to include these pupils in the normal education process among other pupils, with special teachers to help pupils with special needs (Helgason, 2011; Emilsson, 2018). Upon completion of compulsory education, upper secondary education ("Framhaldsskóli") is intended for pupils aged 16 to 20 but is not compulsory.

The American education system is one of the best in the world. It requires 12 years of elementary and secondary education before entering university or college. The US education system

and its hierarchical system are similar in each of the 50 US states, but each state has its own school system within its jurisdiction, where general national requirements are implemented through local state districts, managed by a local school board of their choice citizens. Each US state thus organizes its education independently of the other. There are also differences in education between countries. This can last from 16 to 18 years of age. Up to 30 countries have compulsory education up to the age of 16 (Ward, 2005; Spring, 1994; studyusa.com, 2017).

The difference in the American and Slovak school system is also noted in grading, respectively. In Slovakia, the rating system is numbered 1 (best mark) to 5 (worst mark) (minedu.sk). US grading is based on percentages A, B, C, D, and F (failed), each letter being further divided into + and -, for example, A+, A- (educationusa.state.gov, 2017). In Iceland, the grades for the fourth year of primary school are also written, later, from the fifth grade with the letter A - D, with A being the best grade and D the worst. If a pupil in Slovakia shows insufficient results in one or more subjects during the school year and fails to defend his / her knowledge even at the commissions exams, he / she will repeat the year again. In Iceland it is not possible to repeat the year. In the 4th, 7th and 10th grades, comparative examinations are held between elementary schools in Iceland. They also determine which pupils are weaker and whether the pupil needs an assistant teacher in the class (Blöndal, 2014).

3.1 Teaching geography

Slovak state educational programs are divided into individual ISCED (International Standard Classification of Education). We will deal with ISCED 1 - 3. We use the ISCED which is followed in Europe and is also accepted by other international organizations (UNESCO, OECD), to develop the SEP and the content of education according to individual levels of education. It expresses the main principles and objectives of the educational policy of the state, as well as the democratic and humanistic values on which national education is based. It defines the general objectives of schools as key competences (competences), in the balanced development of pupils' personalities and the framework content of education (modurmal.com, 2019). In addition to describing the approach to teaching geography, American educational standards are also focused on the general issue of what a particular standard deals with, and also focus on selected examples of what pupils should be able to master after class. Many experts from various institutions worked on their creation. They were released in 1994, but in 2012 they were upgraded to a newer version of standards. These educational standards also have a different structure from ours. They do not have specific standards for each level of study like us, but consist of eighteen standards, which are divided into three educational levels: grades K - 4 = approximately equivalent to our ISCED 1 (primary school); grades 5 - 8 = approximately corresponds to our ISCED 2 (grade 2); grades 9 - 12 = roughly corresponds to our ISCED 3 (SS) Each standard for a given level of education consists of two parts: a) what the student should know at the end of the degree b) what the student will be able to create at the end of the degree, having a skill. The student thus acquires knowledge, which he then transforms into skills. US standards for teaching geography: 1. How to use maps and other geographic information, tools and technologies to retrieve, process, and write information in space. 2. Using mental maps to organize information about people, places and environment in spatial contexts. 3. How to analyze the spatial distribution of people, places and the environment on Earth. 4. Places and regions. 5. Places and regions - People create regions to explain the complexity of the Earth. 6. How culture and experience affect the human perception of cities and regions. 7. Physical processes that form the Earth's surface. 8. Characteristics and spatial distribution of ecosystems and biomes on the Earth's surface. 9. Systems in human society - characteristics, distribution and migration of human population on the Earth's surface. 10. Characteristics, distribution and complexity of cultures on Earth. 11. Worldwide economic interdependence. 12. Processes, organization and functions of human settlements. 13.

As a cooperation, but also conflicts between people affect the division and control of the Earth's surface. 14. How human activity modifies the human environment. 15. How natural systems affect human activity. 16. Changes that have occurred in the use, distribution and importance of resources. 17. How to use geography to explain the past. 18. Use of geography in choosing a place for future life, work and rest. 19. Use of geography in choosing a place for future life, work and rest (Heffron, Downs, 2012). In Iceland, pupils also encounter the teaching of the local country at the first level where they use the textbook "Komdu og skoðaðu", "Come and see". The geography of the local country itself takes place in the fifth year, mainly in the second semester of the school year. The focus of the course is based on the pupils' independent work on tasks, projects and various individual assignments assigned by the teacher on the current topic. The regional geography of the local country is taught in Iceland in the fifth grade at primary school and is included in a subject called "Samfélagsfræði", which means "social sciences". This course is taught throughout the year from the fifth to the ninth year. It is taught in both semesters in each school year, with most schools teaching History in the first semester and Geography in the second semester. In some schools this order is reversed. Geography is taught three times a week at most of the schools (54 hours per semester). Students have a textbook and workbook at their disposal. However, the textbook is mainly used by the teacher, who prepares different games, projects, group work, map work and various other activities for each subject. The aim is to lead pupils to self-reliance, to teach them to search for information independently, not to learn curriculum (Helgason, 2011). Geography and methods have been taught in the past by many authors such as Holtz, 1917; Lidstone, Williams, 2006 or exploring and teaching land via GIS also Boltziar, Chrastina, 2018.

4 Results and discussion

The aim was to point out the diversity of education systems in Slovakia, Iceland and the USA. Working on the basis of the many resources available to us, it provides the current state of education in each country. The theoretical part of the thesis was based on print sources, for the research part it was field research, internal interviews with competent persons and questionnaire surveys. Finally, we can say that the diversity of education systems in all three regions is considerable. We compared all three school systems while the Slovak and American school systems were more focused on ISCED comparisons, and in comparing the Slovak and Icelandic schools, we focused on the diversity of teaching the regional geography of the local country. In the work where we dealt with Icelandic education, we also focused on the extremely growing tourism in Iceland and its consequences not only on the population but mainly on the landscape and protected areas.

Iceland has seen a sharp increase in tourists since 2010. In 2017, the country was visited by 2.2 million tourists, 6 times more than number of inhabitants. This annual growth causes many problems in the country, especially environmental (Dysková, Šolcová, 2018). Therefore, we focused on protected areas and the impact of tourism on them. This issue was also dealt with by Chalupa, Veselovský (2018). According to the OECD, the country is under high pressure due to the high growth of tourism. Some areas are so disturbed that it will take several hundred years to recover. At the expense of this, many "tourist attractions" have already been closed, which is also borne by local residents. According to the Environment Agency in Iceland, biodiversity and landscape conservation expenditures increased by almost 30% in the five-year period (2011-2016) (Umhverfisstofnun.is, 2017). This is one of the reasons why we designed a professional route in Iceland for pupils of different degrees of study as well as for tourists. It is one of the teaching forms applicable in teaching the geography of the local landscape.

4.1 Proposal routes to Iceland with a focus on the teaching of regional landscape geography

Since Iceland has been a very popular destination for many tourists in recent years, we have created a map of the most interesting and famous places on the island. The route has a circular character and consists of twenty stops. The design of the route (Fig. 1) has a circular character. The meaning of the route is to get to know the most beautiful and well-known places on the island. The route is designed to provide observation of the whole country. The estimated length of the circuit is 1,720 km and consists of twenty stops. The island's round trip is called number one or Ring Road. It is not demanding and no special off-road vehicles are required, as it would be for a tour inland or the West Fjords region. Estimated route length is 4 - 7 days. The route was designed to be accessible to all ages. A professional guide is required at stops number 7 - in the Jökulsárlón glacier lagoon and number 13 - in the Langjökull glacier tunnel. There are many travel agencies available in Iceland that offer various island tours. One of them is the Slovak travel agency D-Travel with a Slovak guide.

Fig. 1: Design of a circular route in Iceland



The author: Dysková by ArcGIS 10.2, 2019

List of stops of the proposed route through Iceland:

1. Keflavík
2. Bridge between two continents
3. Blue Lagoon
4. Geothermal area Krysuvík
5. Seljalandsfoss and Gljúfrabúi waterfalls
6. Waterfall Skógafoss
7. Dyrhólaey and Reynisfjara Black Beach
8. Glacier Lagoon Jökulsárlón and Diamond Beach
9. Egilstaðir
10. Dettifoss waterfall
11. Lake Mývatn
12. Akureyri
13. Hraunfossar and Barnafoss waterfalls
14. Langjökull glacier
15. Þingvellir National Park
16. Strokkur Geysir
17. Gullfoss waterfall
18. Crater Kerið
19. Hot springs in Hveragerði
20. Reykjavík

The start and end of the route is at the Keflavik International Airport on the Reykjanes Peninsula, from where we continue eastwards. The second stop is near Keflavik, and it is a bridge between the two continents, which was built as a symbol for connecting Europe and North America. Twenty kilometers from Keflavik is the famous Blue Lagoon, which is visited by more and more tourists every year. Booking is required at least one month in advance during the summer season. From Blue Lagoon we move to the geothermal area Krysuvík (Fig. 2), where you can swim in the thermal river. Close to Krysuvík is a 46 meters deep maar with a diameter of 350 meters. This maar is of green color, which is caused by algae. On this route there are the most famous and most beautiful waterfalls on the island. The south

coast offers us three waterfalls. The Seljalandsfoss, Gljúfrabúi and Skógafoss are in close proximity to each other. Only thirty kilometers from the Skógafoss waterfall is Iceland's southernmost peninsula - the 120-meter-high Dyrhólaey rock massive, which has been created due to severe erosion in recent centuries (Grunewald, Gilbertas, 2012). Only a few meters away from the massive arch is the Black Beach - Reynisfjara in Vík, which is of volcanic origin, as evidenced by its surroundings formed by basalt columns, caves, lava formations and cliffs. The next stop is the glacier lagoon Jökulsárlón (Fig. 3), after which a boat trip is possible. The icebergs from the Vatnajökull glacier, which reached through the Jökulsárlón Lagoon to the nearby beach, look like diamonds on the black volcanic sand. Therefore, this famous beach is called Diamond. From the southern region, the route leads to the calm east of the island, to the surrounding area of Egilstaðir in the east of the island, where there are 28 hiking trails for waterfalls, canyons, caves, lakes and many other natural beauties (Guðmundsson, 2007; 2018). From the eastern part of the island we move to the northeast of the island. North of Route 1 is the massive Dettifoss Waterfall. In the area of active volcanism, near the Krafla volcano, there is a shallow lake Mývatn, known for its high incidence of various birds and insects. This is followed by the "capital of the north" - Akureyri, where several museums (museum of art, industry, aviation, Icelandic folk museum, old toy museum and city museum) are located. In the mountainous surroundings above the town there is the possibility of skiing on the slope Híðarfjall (Evans, 2014; gamma.is, 2018). In the western region there are interesting waterfalls Hraunfossar and Barnafoss located only sixteen meters apart. Hraunfossar Waterfall means "Lava Waterfall", and Barnafoss is "Children's Waterfall", named after two children who had fallen long ago into this waterfall and were not found. The board in front of the waterfall informs about this unfortunate event (guidetoiceland. 2017). Near the waterfalls there is the Langjökull glacier, where a professional tour of the glacier tunnel is possible. The next stop will take us again to the southern region, to the southeast of Iceland, where there are five more stops. The first is the Þingvellir National Park, which creates beautiful nature and is the only UNESCO World Heritage Site on the island. The Golden Triangle, or the Golden Ring, is complemented by the Strokkur Geysir and the Gullfoss Waterfall. To the south of the Golden Triangle is the famous Kerið Crater, whose caldera and slopes, as well as other volcanic rocks in the area, are red to black. This means that iron deposits are still geologically fresh (Bergmann, 2004; guidetoiceland, 2017). The southern region closes the penultimate stop of the whole route - the geothermal area Hveragerði. Geothermal energy is transmitted by the deep circulation of groundwater and the movement of tectonic plates, which exits to the surface in the form of hot steam or water. The last stop of the route is the capital itself - Reykjavik, where you can visit, among other things, the well-preserved historical architecture of the country in the old part of the city. It is interesting that Icelandic cities do not have squares (extremeiceland.is, 2018).

Fig. 2 Geothermal area Krysuvík



The author: Dysková, 2018

Fig. 3 Glacier in Jökulsárlón lagoon



Source: extremeiceland.is, 2018; edited by Dysková, 2019

5 Conclusion

Every country in the world has its own education system, whether it is a high-level education system or one that is still developing and shaping in some way. Education is also one of the areas that significantly influence the development of the

society. When comparing the individual systems we found diametrical differences between the Slovak and American school systems. The most significant difference is the number of years of each degree.

School systems also differ in the number of years of compulsory education, with us being 10 years and in the US 12 years in most of their countries. Another difference is that there is no "intermediate level" between primary and secondary school in the United States. We also think that the American education system has a very interesting system in that students can choose what other subjects, besides the compulsory ones, they want to study because each pupil is individual. This is also possible in Iceland. Some pupils are more focused on languages, for example, others on the technical sphere, and therefore have the opportunity to better improve what they enjoy. On the one hand, this is good, because more ambitious pupils who want to go to a chosen university can better prepare by focusing mainly on the subjects that are important to them. On the other hand, many students, especially in secondary schools, abuse this system by choosing relatively simpler subjects.

The curriculum in Iceland is not as extensive as in Slovakia, but it promotes creativity and equality between children. Compulsory school attendance lasts 10 years as well as in Slovakia. Creativity - that is, pupils are evaluated primarily on the basis of their own work in lessons, for the various tasks and projects they work on and then present to others. Education works on a well-elaborated e-learning method, which means that pupils receive from their school their own tablets or notebooks, which they use not only to work on lessons (ie they do not use workbooks) like pupils in our country, but also work on their occasional homework. Equality - that is, all pupils are equal, which is largely pointed out by teachers, but most importantly, pupils who are handicapped or otherwise disadvantaged are in the classroom together with regular students.

Nevertheless, the excursion is a very suitable and effective outdoor teaching form of geography of the local country usable in all three countries, ie in Iceland, Slovakia and the USA. Based on our research, we found that excursions are most used in Slovakia and least in Iceland.

Literature:

- Bergmann, D.: Skaftafell - National park. Reykjavík: JPV Publishers, 2004. ISBN 9979-781-15-7.
- Blöndal, K.: Student Disengagement and School Dropout. Reykjavík: Háskólaprent ehf., 2014. ISBN 978-9935-9214-0-6.
- Bolitižiar, M., and Chrastina, P.: Application of Geographical Information System (GIS) in Geography (Digital data pre-processing for land-use changes analysis). In Turcani, M; Balogh, Z; Munk, M; Kapusta, J; Benko, L (Eds.), *Divvai 2018: 12th international scientific conference on distance learning in applied informatics*, Nitra: UKF, 2018, pp. 29-36. Accessible at: <https://publons.com/journal/258699/divvai-2018-12th-international-scientific-conference>
- Dysková S., and Šolcová, L.: Economic, spatial and environmental aspects of growing geotourism in Island Iceland. In Klímová, V., Žitek, V. (eds.) *21st International Colloquium on Regional Sciences. Conference Proceedings*. Brno: Masarykova univerzita, 2018. pp. 595-602. ISBN 978-80-210-8969-3
- Education Usa: United states department of education. Accessible at: <https://educationusa.state.gov/>[cit. 2017-01-15].
- East: Visit Austurland. Accessible at: <https://www.east.is/>[cit. 2017-01-15].
- Emilsson, R.: Islandská skola neučí tolik jako česká, ale podporuje tvořivost a rovnost. Accessible at <https://perpetuum.cz/2018/01/islandska-skola-neuci-tolik-jako-ceska-ale-podporuje-tvorivost-a-rovnost/>[cit. 2017-01-15].
- Evans, A.: Iceland. USA: The Globe pequot Press Inc, 2014. ISBN 978-1-84162-499-0.
- Extremeiceland: The Ice Age Tour - Into the Glacier. Accessible at: <https://www.extremeiceland.is/en/activity-tours-iceland/glacier-hiking-iceland/ice-caves/driving>. [cit. 2019-02-12].
- Gamma: Tourism in Iceland. Accessible at: <https://www.gamma.is/media/skjol/Gamma-Tourism.pdf> [cit. 2019-02-12].
- Grunewald, O., and Gilbertas, B.: Iceland in motion. Reykjavík: Forlagið, 2011. ISBN 997-95-355-63.
- Guide to Iceland: 10 Things to do in Reykjavik. Accessible at: <https://guidetoiceland.is/reykjavik-guide/top-10-things-to-do-in-reykjavik>.
- Guðmundsson, H.: Golden Circle. Reykjavík: JPV Publishers, 2007. ISBN 978-9979-798-77-4.
- Grežo, H., and Petrovič, F.: How open source can expand teacher's horizons. In Conference: 12th Annual International Conference of Education, Research and Innovation. Sevilla, 2019. pp. 8515-8519 Accessible at: <http://dx.doi.org/10.21125/iceri.2019.2029>.
- Heffron, S., and Downs R.: Geography for Life: National Geography Standards. Washington: National Council for Geographic Education, 2012. ISBN 978 - 1 - 884136 - 41 - 2.
- Helgason, M.: The Icelandic education system. Accessible at: <https://grapevine.is/mag/articles/2011/09/05/the-icelandic-education-system/> [cit. 2019-02-12].
- Holtz, F.: Principles and methods of teaching geography. New York: Macmillan company, 1917. 394 s.
- Horák, J., Kolář, Z.: Vzdělávací politika a řízení škol v zemích EU. Ústí nad Labem: Univerzita J. E. Purkyně, 2007. ISBN 978-80-7044-894-6.
- Chalupa, P., and Veselovský, J.: Link of the Natural and Human Components of the Geosphere in Historical Development as a Motivation for the Visist of Moravian Karst. *Geografické informácie*. 2018. 22(1), pp. 163-179. Accessible at: <http://dx.doi.org/10.17846/GI.2018.22.1.163-179>
- Jónsdóttir, J.: A topographic map of Iceland with the main river systems and glaciated areas. Accessible at: https://www.researchgate.net/figure/A-topographic-map-of-Iceland-with-the-main-river-systems-and-glaciated-areas_fig1_239789531[cit. 2019-02-12].
- Khonamri, F., Azizi, M., and Kralik, R.: Using interactive e-based flipped learning to enhance EFL literature students' critical reading. *Science for Education Today*. 2020. 10(1), pp. 25-42. ISSN 2658-6762
- Lidstone, J., Williams, M. 2006. *Geographical education in a changing world*. 1. vyd. Holandsko: Springer, 2006. 250 s. ISBN 1- 4020- 4806- 8
- Ministerstvo Školstva, Vedy, Výskumu a Športu SR: Správa o stave školstva na Slovensku. Accessible at: <https://www.min.edu.sk/data/att/5250.pdf> [cit. 2019-02-12].
- Ministry of education, science and culture: The Educational system in Iceland. Reykjavik: Oddi, 2002. ISBN 9979-882-82-4.
- Móðurmál: Výchova slovenského jazyka na Islande. Accessible at: <http://www.modurmal.com/slovak-slovakiska>. [cit. 2019-02-12].
- Spring, J.: American education. USA: McGraw - Hill, 1994. ISBN 0-07-060551-3.
- Study Usa: Difference between a school, college and university. Accessible at: <https://studyusa.com/en/a/107/what-is-the-difference-between-a-school-college-and-university-in-the-usa>. [cit. 2019-02-12].
- Umhverfisstofnun: Protected areas in Iceland. Accessible at: <https://www.ust.is/the-environment-agency-of-iceland/protected-areas/#Tab1>[cit. 2020-02-10].
- Ward, C.: Native Americans in the School System Family, Community, and Academic Achievement. The United States of America, 2005. ISBN 0759106096.

Primary Paper Section: D

Secondary Paper Section: AM

THE GROWTH OF TOURISM AND ITS IMPACT ON THE PROTECTED AREAS OF ICELAND

^aSIMONA DYSKOVÁ, ^bLUCIA PETRIKOVIČOVÁ, ^cMARIE ROUBALOVÁ

^{ab}*Constantine The Philosopher University in Nitra, Faculty of Natural Sciences, Department of Geography, Tr. A. Hlinku 1, 94974 Nitra, Slovakia;* ^c*Hussite Theological Faculty Charles University in Prague, Pacovská 350/4, 140 00 Praha, Czechia*
Email: ^asimona.dyskova@gmail.com, ^blpetrikovicova@ukf.sk, ^cmarie.roubalova@hcf.cuni.cz

The study was carried out thanks to the international research project: Social and Innovative Platform on Cultural Tourism and its Potential towards Deepening Europeanisation (SPOT, www.SPOTprojectH2020.eu) funded by the European Commission H2020 Programme under Grant Agreement number: 870644.

Abstract: Iceland or the land of fire and ice has been a great attraction for many tourists in recent years. Every year thousands of tourists visit the country with more than 360,000 inhabitants. Interest in the country began to grow approximately ten years ago. In April 2010, when Eyjafjallajökull, a volcano in southern Iceland, began spewing several kilometres of volcanic ash into the atmosphere. The cloud of ash forced the greatest airspace closure since World War II, cancelling nearly 100,000 flights and disrupting the travel plans of tourists and business travelers alike throughout northern Europe. The island had traditionally held little appeal to international tourists and most of the country's GDP came from its fishing industry. Then, in 2008, the financial crisis sent the world's economy into a tailspin which triggered a series of hardships that threatened to destroy the country's reputation. The Icelandic Krona depreciated significantly as Icelandic banks were unable to repay their short-term debt, and over the course of a few weeks Iceland garnered more media attention than it had had in the previous two decades. Although the number of tourists in 2019 was lower than in the previous year, there are still so many. In addition to increasing economic growth, this trend of increasing tourism has a negative impact on the environment in the country. In this paper we focused on the most visited protected areas and their perception by tourists from an environmental point of view. We evaluate the impact of tourism and its impact on the landscape. Part of the work is a questionnaire survey focused on tourists, their national composition, length of stay in the country and regions that they traveled during their visit and so on.

Keywords: Iceland. Tourism. Protected areas. Thingvellir. Vatnajökull. Snæfellsnes.

1 Introduction

The continuous development of tourism helps to create and develop a wide-spectrum phenomenon, which is also a recreational urbanization, ie building a new material and technical base infrastructure. The consequences of the phenomenon are now more evident in the negative sense as in the positive sense. Just the original specifics of natural and the socio-economic conditions of the territory are disturbed by tourism. Recreation the use of the landscape also brings back influential sites through recreation itself and activities associated with it. Paradoxically just uniqueness and the peculiarity of the country, which is the primary impulse for the development of tourism is under the influence of tourism gets into the background. Through tourism occurs functional change of territory from the original resident function to the tourist function, taking the effects of recreational urbanization itself manifest themselves as on individual elements of the landscape structures, as well as local residents (Boltižiar, Chrastina, 2018). Analysis of the impact of tourism on the landscape and protected areas in the border regions Jakubcová, Grežo, Petrovič (2015), Petrikovičová, Krogmann, Fialová and Svorad (2019), Cottage, Veselovský (2018), Krogmann, Bilic (2010).

Iceland is a country of many contrasts. Its unique nature attracts more and more tourists every year. They discover the distinctive beauty of the island in the form of geysers, hot thermal springs, but also glaciers, waterfalls, volcanoes and craters, volcanic black beaches or lava fields. Up to 83% of all foreigners visit Iceland because of this unique interplay of natural elements (gamma.is, 2017). However, the number of tourists began to multiply the number of inhabitants. In 2018 there were 7 times more tourists in Iceland than the total population. This rush of tourists has resulted in the country coming out of the economic crisis ten years ago, and Iceland has begun to flourish. They built hotels, opened new pensions, camps, hostels. Souvenir shops, restaurants, cafes, but also new roads, car parks and public toilets have been opened to meet all the needs of tourists. However, this high increase in visitors to the island was negatively carried by

nature. Some places have started to charge (even for the locals) and close the most visited ones so that nature can regenerate again. In the article we deal with island tourism in recent years, the national composition of tourists, the most visited places on the island in individual regions, protected areas in Iceland and the impact of tourism on protected areas.

2 Methodology of work

We used several methods. The first was field research, where we personally met the owners of selected travel agencies in Iceland and marketing representatives of the Airbnb company in Iceland, which mediates accommodation. Meetings were conducted to gather information about tourists staying on the island. We also used the questionnaire method. It was intended for tourists and concerned first of all general information about the visit to the island, but we were also interested in their attitude to protected areas in Iceland and the impact of tourism on them. It was implemented in April 2019 and was filled by 123 respondents from 26 countries. Thanks to the questionnaire surveys we were able to process the statistical data and to base it on writing the work. Another method was to collect literature, using both print and electronic resources. The print sources were books borrowed from libraries in Reykjavik and in Hafnarfjörður. Regarding electronic resources, we mainly worked with data from the Statistical Office in Iceland and the Ministry of Environment of Iceland. We used the method of system analysis and mathematical - statistical method, which we used for data evaluation and their concentration into tables and graphs.

3 Tourism in Iceland

Tourism in Iceland has experienced a huge increase over the last decade. The number of visitors to Iceland began to rise in 2009, when tourism took the country out of the economic crisis. This resulted in a decline in the Icelandic currency, making the country much cheaper for foreigners than before. Foreigners' interest in this country began to increase significantly, especially since 2010. The tourism sector has expanded, creating a lot of jobs and not only tourists but also people who have decided to live and work in the country. Tourism is also a major benefit of money and has a beneficial impact on the local economy, the labor market and the construction industry, but is also becoming a problem that can have devastating consequences. Locals were not prepared for such flushing visitors, but also pay higher prices for services and housing, which have risen by 25% in the last 12 months (Þórssón, 2017 In Dysková, Šolcová, 2019). Tab. 1 shows the number of tourists in Iceland between 2010 and 2019.

Table 1: Number of tourists in Iceland in 2010 - 2019

Year	Number of tourists
2010	488 600
2011	565 600
2012	672 800
2013	807 300
2014	997 300
2015	1 289 100
2016	1 792 200
2017	2 224 600
2018	2 343 773
2019	2 013 190

Source: Statistics Iceland, Icelandic Tourist Board, 2020; elaborated by authors, 2020

The number of tourists has risen steadily since 2010 until 2019. In 2019, the Icelandic Statistics Office has dropped by more than 330,000 visitors compared to last year. The beginning of 2020 - January and February (before the outbreak of world epidemic) - has also seen a decline in tourists. One of the main reasons for the decline was the crash of one of two Icelandic airlines - WoW Air (Icelandic tourist board statistics, 2020).

3.1 Nationality of tourists

At work, we decided to zoom in to the most visited period throughout the year - summer, as shown in Tab. 2. In the summer of 2019, 678,080 tourists visited Iceland, with almost 30% being American tourists. Germany, France, China, Great Britain, Canada, Poland, Spain, Italy and Denmark are also among the top ten nationalities. However, in all countries except China and Denmark, we are seeing a decline in visitors compared to last year. According to the table, we can see that the number of visitors is decreasing compared to last year. Over the last 12 months, more than 35% of American tourists have lost. There is also a greater difference for Canada (-23.4%) and the United Kingdom (-19.7%). There is an increase in visitors from China (11.5%) and a smaller increase in Denmark (0.5%).

Table 2: Nationality of tourists during the summer of 2019 (June - August) and comparison of the number of visitors last year

Country	Number of visitors in %	Number of visitors	Change from last year
1. USA	27,8 %	188.552	-35,7 %
2. Germany	8,4 %	57.148	-2,8 %
3. France	5,8 %	39.494	-2,0 %
4. China	5,0 %	33.751	11,5 %
5. Great Britain	4,9 %	33.492	-19,7 %
6. Canada	4,2 %	28.677	-23,4 %
7. Poland	4,2 %	28.439	-1,2 %
8. Spain	3,6 %	24.258	-5,3 %
9. Italy	3,2 %	21.687	-0,5 %
10. Denmark	2,6 %	17.608	0,5 %
Total	-	678,080	-15,6 %

Source: Statistics Iceland, Icelandic Tourist Board, 2020; elaborated by authors, 2020

3.2 Most visited places in Iceland by region

According to the administrative breakdown, Iceland is divided into eight regions (Fig. 1). In this work we devote to the most visited regions of Iceland and closer descriptions of the most interesting places in each region.

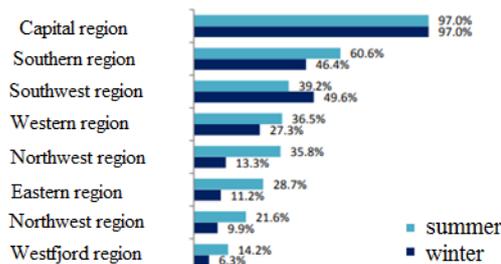
Fig. 1: Administrative division of regions in Iceland



Source: icelandregions.com, 2010; elaborated by authors, 2020

Chart 1 shows that the most visited region in both winter and summer is the capital region, which is visited by 97% of Iceland's visitors in both seasons. The second most visited region in the summer is the southern, and in winter the south-western region. The western region can be described as the third most visited. Others are the northwest region, the east and northeast regions. Lastly, the region of the western fjords is hard to reach.

Chart 1: Iceland's most visited regions in 2015



Source: Óladóttir, 2015; elaborated by Dysková, 2019

1. Capital Region ('Höfuðborgarsvæðið')

This region is formed by the agglomeration of the northernmost capital in the world - Reykjavik. The region has a population of more than 227,030 (2018), meaning that more than 60% of the island's population lives in the region. The most visited places include the Hallgrímskirkja Church, which, with its height of 74.5 meters, is the second tallest building in Iceland. In the capital there is a concert hall "Harpa" (Fig. 2), which is covered with basalt crystals, typical for Iceland. In the capital is also interesting glass dome "Perlan", National Museum, or Viking ship "Solfar" (Fig. 3).

Fig. 2: Concert hall „Harpa“



Source: Dysková, 2018

Fig.3: Viking ship „Solfar“



Source: Dysková, 2018

2. South-West Region ('Suðurnes')

The South West region is one of the most visited, mainly due to the Blue Lagoon, which was visited by 40.6% of all visitors in winter 2015 and 31.5% in the summer. Nearby is the geothermal area "Krysuvík", known for its sulfur fields, boiling springs, colorful hills and volcanic openings (Figures 4 and 5).

Fig. 4: Krysuvík geothermal area



Source: Dysková, 2018

Fig. 5: Krysuvík area



Source: Dysková, 2018

In this region, on the Reykjanes Peninsula, there is also the Gunnhver Geopark and the well-known bridge between the two continents, which imaginarily connects the North American and Eurasian tectonic plates (Fig. 6 and 7).

Fig. 6 and 7: Bridge between two continents



Source: Dysková, 2017

Source: Dysková, 2017

3. Southern Region ('Sudurland')

The southern region is very popular with tourists. There are many waterfalls, black sand beaches, moss fields, glaciers, geysers and geothermal areas. The largest city in the region is Selfoss with a population of 7 616 (2018). Almost the whole area is formed by the Katla UNESCO Geopark (Fig. 8), which is named after the famous Icelandic volcano - Katla, located under the Mýrdalsjökull glacier. This Geopark is located in Iceland's most volcanically active area, where the Eyjafjallajökull, Katla and Grímsvötn volcanoes are located. The region is therefore characterized by central volcanoes, eruptive craters, cracks, lava fields, table mountains and basalt cones (Katlageopark.is, 2018).

Fig. 8: Delimitation of UNESCO Geopark Katla territory



Source: katlageopark.is, 2015; elaborated by authors, 2019

In the Geopark there is the famous Black Beach in Vík (Vík is the southernmost village in Iceland with approximately 300 inhabitants) called "Reynisfjara", which National Geographic declared in 1991 as one of the ten most beautiful non-tropical beaches of the world (guidetoiceland.is, 2017). On the beach there is a cave consisting of basalt columns (Fig. 9, 10).

The southern region is known for its numerous waterfalls. The most famous are the Skógafoss, Seljalandsfoss, Háifoss, Hjalparfoss or Svartifoss waterfalls. A great attraction in the region is the Vatnajökull National Park, but also the Þingvellir National Park, which is part of the so-called. "Golden Circle". It is formed by the Gullfoss waterfall and the geothermal area of Haukadalur, where there are two famous geysers - "Geysir" and "Strokkur". There is another known geothermal area in the region - in the village of Hveragerdi. North of Hveragerdi there is a 3,000-year-old crater Kerið. It is 55 meters deep and 170 meters wide (Fig. 11). A unique feature of the southern region is the largest glacial lagoon on the island, Jökulsárlón (Fig. 12), created by the melting of the Vatnajökull glacier. After heating the ice massive pieces float towards the ocean through the lagoon. The largest pieces, which can be more than a thousand years old, are 20 to 30 meters in size. This lagoon never looks the same and its appearance can change completely during the night. It depends on the temperature of the air, water, currents and wind. Only one kilometer from the lagoon is the famous Diamond Beach (extremeiceland.is, 2018).

Fig. 9: Reynisfjara beach in Vík



Source: Dysková, 2019

Fig. 10: Basalt columns



Source: Dysková, 2019

Fig. 11: Kerið crater



Source: Dysková, 2019

Fig. 12: Glacier in Jökulsárlón lagoon



Source: Dysková, 2019

4. Eastern region ('Austurland')

The eastern region belongs to a quieter, not very popular tourist area. The largest city is Egilsstaðir with a population of 2,464 (2018). Only 25 kilometers from this city is the largest forest in Iceland - "Hallormsstadur" with an area of 740 ha. The region boasts fjords, fishing villages, green valleys and although smaller waterfalls, there is Iceland's second highest waterfall - Hengifoss, 128 meters high. In this region is the easternmost city of Iceland - Neskaupstaður with 1500 inhabitants (east.is, 2018).

5. Northeast Region ('Norðurland eystra')

In the north-eastern region, on the coast of the fjord Eyjafjörður, is the largest city of the region - Akureyri. With a population of 18 860 (2018) is Iceland's fourth largest city. This region boasts Lake Mývatn, which was founded approximately 2,300 years ago with a strong eruption of basaltic lava. Today it fills an old glacial basin. It has an area of 38 km² and a depth of 4.5 meters. There are many lava formations or the Hverfjall crater in its surroundings. Near the lake, on the river of glacial origin - "Jökulsá á Fjöllum" is a waterfall Dettifoss. This waterfall is the strongest in Europe with a flow rate of 200 to 500 m³ per second (Fig. 13) (Stainer, 2014). Húsavík, which is famous for its whale watching, is popular for tourists.

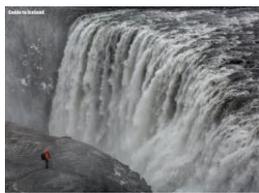
6. Northwest Region ('Norðurland vestra')

By population the largest city in the northwestern region of Iceland is Sauðárkrúkur, with a population of 3,151 (2018). This region is not very popular with tourists. Between the Langjökull and Hofsjökull glaciers is the Hveravellir geothermal area with a lot of hot springs and smelting water holes. This nature reserve is one of the largest geothermal areas in the country (hveravellir.is, 2019).

7. Westfjord region ('Vestfirðir')

The Western Fjords region is very sparsely populated. The largest city - Ísafjörður has a population of only 2,570 (2017). Due to the rugged relief, transport to the region is very complicated. There is the Hornstrandir Nature Reserve on the peninsula, accessible only on foot or by boat, inhabited only by arctic foxes, seals and birds. This region is particularly attractive due to the massive waterfall Dynjandi (or Fjallfoss), which was declared a natural monument in 1981 (Fig. 14). There is also a 10 km long sandy beach of Rauðasandur, which is unusual for Iceland (westfjords.is, 2017).

Fig. 13: Waterfall Dettifoss



Source: guidetoiceland.is, 2010

Fig. 14: Dynjandi waterfall



Source: justiceland.com, 2012

8. Western region (*Vesturland*)

Western Iceland is also referred to as "Sagaland" because of the many fairy tales, stories and sags about elves and trolls that are still very popular in the country to this day. This region is one of the most visited. The largest city is Akranes with a population of 6,700 (2018).

There is the National Park Snæfellsnes known mainly for the active volcano Snæfellsjökul. The region has the longest fjords on the island - Hvalfjörður and Kos. The lava cave Víðgelmir (Fig. 15) located in the lava area of Hallmundarhraun is popular for tourists. The cave is 1.5 km long and 16.5 meters wide making it the largest cave of its kind on the island. The cave entrance is very wide, but gradually the cave narrows (Magnússon, 2018). The western region is also known for Iceland's highest waterfall - Glymur, 198 meters high. The path to it is accompanied by many smaller waterfalls and caves.

Fig. 15: Wide entrance to the cave Víðgelmir



Source: Dysková, 2018

4 Results

The unique nature of Iceland attracts many tourists every year, which is both positive and negative for the country. The positive thing is that tourism got the country out of the economic crisis in 2010, after the eruption of the famous Eyjafjallajökull volcano, and so far it has been the largest source of revenue for the state budget. Tourism created 24,500 jobs (January, 2017), in the summer of 31,700 (August 2017), attracting mainly foreign workers (Óladóttir, 2018). Before the tourist boom, the country's main source of income was the export of fish and aluminum. However, the negative consequences are borne by nature itself, which is not able to cope with this onslaught of tourists. We have therefore focused on the most vulnerable protected areas in Iceland, which have been dedicated to the Environment Agency (Umhverfisstofnun) since 2010, when the number of tourists started to rise. Unless the popularity of the island does not decrease in the coming years, more and more areas will be closed, which is negatively affected not only by the inhabitants but also by the "untouched" and unique nature of the island (In Dysková, Petrikovičová, 2019).

4.1 Protected areas in Iceland

According to the Environment Agency of Iceland ("Umhverfisstofnun"), which is under the auspices of the Ministry of the Environment, it has announced that travel around the island is unrestricted for anyone who respects natural resources and protects the landscape. It emphasizes caution not only for others but also for animals and especially for nature, which is very fragile and insensitive treatment can damage or destroy the country for several years (Umhverfisstofnun.is, 2017).

According to the Nature and Landscape Protection Act in Iceland, Act no. 44/1999 Coll., The following types of land have special protection and their interference is prohibited in the following places:

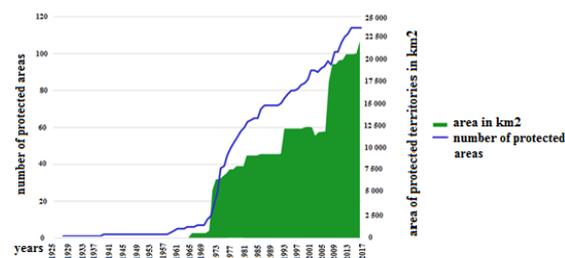
- volcanic craters and lava fields
- freshwater lakes of 1000 m² or more
- swamps and marshes of 3 ha or more
- waterfalls, hot springs and other sources of heat, such as geothermal springs and deposits (sulphurous and travertine) of 100 m² or more;
- salt marshes and marshes (Umhverfisstofnun.is, 1999).

Protected areas in Iceland currently account for 21.6% of the total land area. These areas occupy 22 233 km² of the total land area, which is approximately 103 000 km². This means that protected areas occupy more than 1/5 of the country's territory.

This is mainly due to the fact that in 2008 was declared the largest National Park in Iceland - Vatnajökull, which covers two other parks, Skaftafell, and since 2017 also Jökulsárgljúfur, known for its 25-kilometer canyon. The Vatnajökull National Park covers a total of 14,141 km² and covers 14% of Iceland and houses the largest glacier in Iceland with the same name as the NP. Vatnajökull glacier occupies 8% of Iceland's total area. The National Park has been a UNESCO World Heritage Site since 2008 (vatnajokulsthjodgardur.is, 2018).

The beginning of the protection of the area does not have a long history (Graph 2). The first area to become protected was the National Monument "Þingvellir" in 1928. The most protected areas fall in the 1980s, when the following areas became protected: "Skútustaðagígar", "Húsafell", "Hvannalindir", "Bláfjöll", "Hólmanes", "Eldborg", "Herðubreiðarlindir" or Lake "Myvatn". The last big leap is the establishment of the "Vatnajökull" National Park in 2008. The reason for the protection of most areas in Iceland is the peacock protection of the natural landscape (Umhverfisstofnun.is, 2017 In Dysková, Petrikovičová, 2019).

Graph 2: Growth in the number of protected areas in Iceland between 1928 - 2017



Source: Umhverfisstofnun.is, 2017; elaborated by authors, 2019

National parks are mostly located in areas unaffected by civilizations with unique fauna and flora, biodiversity, ecosystems or sites with special geological characteristics. National parks are established by the state, unless there are special circumstances and an agreement between the landowner and the Ministry of the Environment. There are three national parks in Iceland, each of which is unique by something different (Umhverfisstofnun.is, 2017). Þingvellir is the oldest of them, founded in 1930, declared the National Park in 1944 and in 1983 was inscribed on the UNESCO World Heritage List. The area is 92.7 km². Snæfellsnes National Park was founded in 2001. It features unique mountain ranges, lava formations, coasts, bird cliffs and 700,000 years old snow-covered stratovolcano. It covers an area of 170 km². Vatnajökull National Park was founded in 2008 by joining two National Parks, Jökulsárgljúfur and Skaftafell. Thus, one with an area of over 12,000 km² was created, making it the largest NP in Iceland (Bergmann, 2004 In Dysková, Petrikovičová, 2019).

The high protected area is another category of land protection. There are habitats of European or national importance, where the favorable state of these habitats depends on the care of a human being. There are several protected areas in Iceland, intended mainly for recreational purposes and are open to the general public. Protected areas in Iceland present smaller areas, and very undesirable by tourists. For example, the Böttgvístaðafjall in Dalvík, in the north of Iceland, is known for its ski resort. The Rauðhólar (Fig. 16) near the capital is known for the volcanically colored red and black mountain ranges that visitors can enjoy while riding on horseback offered there (Umhverfisstofnun, 2017 In Dysková, Petrikovičová, 2019).

Fig. 16: Riding in the Rauðhólar protected area



Source: guidetoiceland.is, 2017

Natural monuments include phenomena that are unique either by their appearance or because of the interest of scientists. There are many natural monuments in Iceland. They are waterfalls, volcanoes, hot springs, rock pillars, fossils and minerals. The most famous natural sights include Dettifoss, Hraunfossar, Barnafoss, Selfoss and Skógafoss (Umhverfisstofnun.is, 2017 In Dysková, Petrikovičová, 2019).

A nature reserve is usually a site of up to 1000 ha, where habitats of European or national importance are modified either by the original or by human activity (Umhverfisstofnun, 2017). The nature reserve also includes the young volcanic island of Surtsey, which was founded in 1963 by a volcanic eruption and has been protected since its inception. Ever since 1964, when scientists began researching it, they had observed the presence of various seeds deposited by ocean currents, the appearance of bacteria, fungi and molds. This 141 ha large island is home to 335 invertebrate species and 89 bird species (whc.unesco.com, 2008).

4.2 The impact of tourism on Iceland's protected areas

Guide to Iceland, the world's largest travel guide for Iceland, lists a number of situations in which the protected areas are endangered or destroyed by tourists. These include, for example, illegal camping in car parks or in the wild of these areas, leaving not only a lot of garbage but also human waste, which is also shown by signs prohibiting illegal activity on the island (Fig. 17). Furthermore, it is a violation of prescribed routes and creating their own paths or roads for motor vehicles, creating soil erosion. Not respecting the boundaries of, for example, geysers, rivers and waterfalls not only destroys the flora, but also endangers their own lives. Danger also occurs when traveling to the country, where access is only allowed with an experienced guide.

Very often, the moss is clogged and deliberately destroyed, which takes hundreds of years to grow again (Fig. 18). Throwing coins into hot springs, waterfalls and geysers is also prohibited, but many people ignore them. The only place of all protected areas, where permitted, is the National Park - Peningagjá Rift. It is forbidden to build "pyramids" from stones that degrade the soil, as shown in Figure 19. It is also forbidden to take lava home, move it or deplete it by vandalism (Figures 20 and 21). Vandalism of tourists also succumbed to other national monuments. The landscape is also devalued by many artists for better photography. For example, artist Marco Evaristti, a native of Chile, damaged the country in 2015 by throwing a red color into the Strokkur geyser to have a more interesting photo of his explosion (Fig. 22), for which he was arrested and had to pay a fine. There have been many bans on the island in recent years

(Fig. 23), commands and information boards on how to behave in that area. Many new information announcements are found in the area of the most visited places informing about the ban on entering the area or a marked footpath. New roads are being built, car parks, public toilets and restaurants are being built around natural monuments that are slowly starting to be charged (guidetoiceland.is, 2017, In Dysková, Petrikovičová, 2019).

Fig. 17 Prohibition of illegal camping and carrying out human needs in the wild



Source : Dysková, 2019

Fig. 18: Moss destruction



Source: guidetoiceland.is, 2017

Fig. 19: Building of pyramids



Source: guidetoiceland.is, 2017

Fig. 20: Vandalism on the from stones island

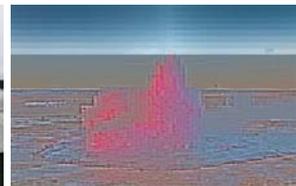


Fig.21: Vandalism on the island



Source: guidetoiceland.is, 2017

Fig. 22: Color burst of Strokkur geyser



Source: guidetoiceland.is, 2017

Fig. 23: No entry sign



Source: Dysková, 2019

5 Conclusion

What could have been interpreted as a disaster for Iceland's economy, turned out though to be a blessing in disguise. The ash cloud thrown up by the volcano threatened to damage the country's important tourist trade in a storm of negative publicity. Negative sentiment towards the country in key tourist sources went from 19% three days after the explosion to 72% in just seven days (mrs.org.uk, 2014).

Criticism in the international media about the country's financial situation, coupled with a global drop in leisure travel, led to a negative growth rate in foreign visitor arrivals in Iceland in 2009. All hope was not lost, however, and hope came from a most unlikely source: the eruption of Eyjafjallajökull in the spring of 2010 (hospitalityinsights.com, 2020).

However, in the first quarter of 2020, a new situation occurred, not only for Iceland itself, but for the whole world. The coronavirus pandemic began in Iceland in March 2020. However, the number of tourists has already begun to decline since the beginning of 2020. Compared to last January and February, this is a 10 percent drop in visitors this year. Iceland has implemented travel restrictions for the Schengen area and the European Union. Since 20 March 2020, foreigners - with the exception of EU / EEA, EFTA or United Kingdom nationals - have no access to Iceland (ferdamalastofnun.is, 2020). As a result of this pandemic, tourism on the island was terminated indefinitely. It means hard times for accommodation facilities, island travel agencies, restaurants and others who have lived in tourism. Although tourism in the country has fallen a little, managers of roughly 40 percent of companies in tourism see 2021 optimistically: "In the long run, we're optimistic about continued growth in tourism in the country, and we expect it to exceed the global average to some extent," Daniel Svavarsson, PhD, head of Landsbanki's economics division, states. "The growth will, however, be much slower than what we've seen in recent years and on a more sustainable basis." (mbl.is, 2020). The positive thing about this situation is that after many years, Iceland's nature and protected areas have time to regenerate.

Literature:

- Boltižiar, M., Chrastina, P. 2018. *Application of Geographical Information System (GIS) in Geography (Digital data pre-processing for land-use changes analysis)*. In Turceni, M.; Balogh, Z.; Munk, M.; Kapusta, J.; Benko, L (Eds.), Divvai 2018: 12th international scientific conference on distance learning in applied informatics, Nitra: UKF, 2018, pp. 29-36. Accessible at: <https://publons.com/journal/258699/divvai-2018-12th-international-scientific-conference>
- Brooklyn brothers agency. 2014. *How Social Media Rescued Icelandic Tourism After The Volcanic Eruption*. online <https://www.mrs.org.uk/pdf/iceland.pdf>
- Dysková S., Petrikovičová L., 2019. *Komparácia slovenského a islandského školského systému so zameraním na výučbu geografie miestnej krajiny s prepojením na CR a chránené územia Islandu*. Rigorózná práca. Fakulta prírodných vied, Katedra geografie a regionálneho rozvoja, Univerzita Konštantína Filozofa, Nitra. 87 s.
- Extremeiceland. 2018. *The Ice Age Tour - Into the Glacier*. online <https://www.extremeiceland.is/en/activity-tours-iceland/glacier-hiking-iceland/ice-caves/driving>
- Ferdamalastofa. 2020. *Tourism in Iceland in figures – january 2020*. online <https://www.ferdamalastofa.is/static/files/ferdamalastofa/talnaefni/ferdatjonusta-i-tolum/2020/january-2020-2.pdf>
- Ferdamalastofa. 2020. *Tourism in Iceland in figures – february 2020*. online <https://www.ferdamalastofa.is/static/files/ferdamalastofa/Frettamyndir/2020/februar/february-2020-2.pdf>
- Ferdamalastofa. 2020. *Tourism in Iceland in figures – summer 2020*. Online <https://www.ferdamalastofa.is/static/files/ferdamalastofa/talnaefni/ferdatjonusta-i-tolum/2019/september/summer-2019-3.pdf>
- Gamma. 2018. *Tourism in Iceland*. online <https://www.gamma.is/media/skjol/Gamma-Tourism.pdf>
- Guide to iceland. 2017. *Reynsfjara Black Sand Beach*. online <https://guidetoiceland.is/travel-iceland/drive/reynisfjara>
- Hospitalityinsights. 2020. *Eyjafjallajökull: the volcano that caused an eruption in icelandic tourism*. Online <https://hospitalityinsights.ehl.edu/iceland-tourism-boom>
- Chalupa, P., Veselovský, J. 2018. *Link of the Natural and Human Components of the Geosphere in Historical Development as a Motivation for the Visit of Moravian Karst*. In Geografické informácie. 2018. 22(1), pp. 163-179. Accessible at: <http://dx.10.17846/GI.2018.22.1.163-179>
- Iceland. 2018. *The regions of Iceland*. online <https://www.iceland.is/press/press--media-kit/the-regions-of-iceland/>
- Icelandmonitor. 2020. *Nearly 2.2 million tourists expected 2021*. Online https://icelandmonitor.mbl.is/news/news/2019/09/26/nearly_2_2_million_tourists_expected_2021/
- Icelandregions. 2010. *Iceland regions.svg*. online https://commons.wikimedia.org/wiki/File:Iceland_regions.svg
- Icelandic tourist board. 2020. *Number of foreign visitors*. online <https://www.ferdamalastofa.is/en/research-and-statistics/numbers-of-foreign-visitors>
- Jakubcová, A., Grežo, H., Petrovič, F. 2015. *A proposal of recreational landscape connection with the function of nature protection within cross-border networks (in Slovak - hungarian buffer zone)*. In 10th International Conference on Topical Issues of Tourism. 2015. pp. 165-177 ISBN:978-80-88064-09-1
- Katlageopark. 2015. *About katla - map*. Online <http://www.katlageopark.com/about-katla/maps/>
- Khonamri, F., Azizi, M., and Kralik, R.: Using interactive e-based flipped learning to enhance EFL literature students' critical reading. *Science for Education Today*. 2020. 10(1), pp. 25-42. ISSN 2658-6762
- Králik, R., Lenovský, L., Pavlíková, M.: A few comments on identity and culture of one ethnic minority in central Europe. *European Journal of Science and Theology*. 2018. 14 (6), pp. 63-76. ISSN 1842 – 8517
- Krogmann, A., Bilic, M.: Foreign Migration and the Influence of Selected Economic Indicators on Regional Attractiveness of the Slovak Republic in 2008. *Geographia Cassoviensis*. 2010. 4 (1), pp. 16-23. ISSN 1337-6748
- Óladóttir, Þ. 2018. *Tourism in Iceland in figures*, online <https://www.ferdamalastofa.is/static/files/ferdamalastofa/Frettamyndir/2018/tourism-in-iceland-2018.pdf>
- Petrikovičová, L., Krogmann, A., Fialová, D., Svorad, A. 2019. *Intensive tourist-related urbanisation impacts on a mountain village: The case study of Veľká Lomnica in Slovakia*. In: *Geographia Polonica*. Vol. 92, No. 4, 395-408 pp. ISSN 0016-7282 Doi:<https://doi.org/10.7163/GPol.0155>
- Þórsson, E. 2017. *As Many Tourists Stay Airbnb As In Hotels In Reykjavík*. online <https://grapevine.is/news/2017/09/26/as-many-tourists-stay-airbnb-as-in-hotels-in-reykjavik/>
- Statistics iceland. 2018. *Icelandic tourist board*. online <https://www.ferdamalastofa.is/en/research-and-statistics/numbers-of-foreign-visitors>
- Umhverfisstofnun. 2018. *Ástandsmat áfangastaða innan friðlýstra svæða*. online <https://www.ust.is/library/Skrar/utgefing/astand-fridlystra-svaeda-2018.pdf>
- Vatnajökulspjóðgarður. 2018. *Vatnajökull National Park*. Online <https://www.vatnajokulsthjodgardur.is/en/about-us/vatnajokull-national-park>
- Visitreykjanes. 2018. *Around Reykjanes Reserve*. online <https://www.visitreykjanes.is/en/inspiration/towns/town/index/place/around-reykjanes-reserve>

Primary Paper Section: D

Secondary Paper Section: AK, DO

F MEDICAL SCIENCES

FA	CARDIOVASCULAR DISEASES INCLUDING CARDIO-SURGERY
FB	ENDOCRINOLOGY, DIABETOLOGY, METABOLISM, NUTRITION
FC	PNEUMOLOGY
FD	ONCOLOGY AND HAEMATOLOGY
FE	OTHER FIELDS OF INTERNAL MEDICINE
FF	ENT (IE. EAR, NOSE, THROAT), OPHTHALMOLOGY, DENTISTRY
FG	PAEDIATRICS
FH	NEUROLOGY, NEURO-SURGERY, NUERO-SCIENCES
FI	TRAUMATOLOGY AND ORTHOPAEDICS
FJ	SURGERY INCLUDING TRANSPLANTOLOGY
FK	GYNAECOLOGY AND OBSTETRICS
FL	PSYCHIATRY, SEXOLOGY
FM	HYGIENE
FN	EPIDEMIOLOGY, INFECTION DISEASES AND CLINICAL IMMUNOLOGY
FO	DERMATOLOGY AND VENEREOLOGY
FP	OTHER MEDICAL FIELDS
FQ	PUBLIC HEALTH SYSTEM, SOCIAL MEDICINE
FR	PHARMACOLOGY AND APOTHECARY CHEMISTRY
FS	MEDICAL FACILITIES, APPARATUS AND EQUIPMENT

SAOHEALTH 4.0: IMPLEMENTATION BARRIERS IN SLOVAKIA

^aMAGDALÉNA TUPÁ, ^bSIMONA HYŽOVÁ

^aAlexander Dubček University in Trenčín, Faculty of Social and Economic Relations, Študentská 3, 911 50 Trenčín, Slovakia

^bAlexander Dubček University in Trenčín, Faculty of Social and Economic Relations, Študentská 3, 911 50 Trenčín, Slovakia

email: ^amagdalena.tupa@tuni.sk ^bsimona.hyzova@tuni.sk

This publication was created within the project APVV-19-0579 Setting up personnel management processes in hospitals and its impact on the migration of doctors and nurses to work abroad.

Abstract: In healthcare, the phenomenon of Industry 4.0 is called Health 4.0. It represents the integration of modern technologies using available data with the possibilities of artificial intelligence. The main goal of the study is to examine the barriers to the implementation of Health 4.0 in healthcare of Slovak Republic. By analysing many scientific studies dealing with the issue, we have identified obstacles to the transformation of the Slovak healthcare system from a purposefully compassionate system to a value-oriented and personalized system that can ensure an increase in the quality of provided health services. Based on the opinions of healthcare professionals, IT professionals and academic experts, the 15 most important barriers were selected. Subsequently, the TISM (Total Interpretive Structural Modelling) model was developed, which extracted the key barriers influencing the adoption of Health 4.0. The results show that the lack of support from top management and the growing demands on the workforce are the main obstacles with the most significant driving force. Urgent solutions by policy makers and management of healthcare facilities to remove these barriers will reduce the cost of medical interventions and improve the quality of healthcare provided, thus realizing the true potential of Health 4.0.

Keywords: Industry 4.0, Health 4.0, Health 4.0 barriers, health care, TISM

1 Introduction

The Industrial Revolution is the most important development milestone in human history.

Technological progress and industrialization went through four phases (Cline, 2017):

1. Phase - Industry 1.0 (18th century):
Mechanization, weaving loom, use of a steam engine in industrial production.
2. Phase - Industry 2.0 (19th century):
Electrification of production, electric motor as a part of assembly line, mass production.
3. Phase - Industry 3.0 (70s of the 20th century):
Partial automation using memory-programmable controls and computers (robots).
4. Phase - Industry 4.0 (the beginning of the 21st century):
Cyber-physical systems, digitalization and interconnection of networks of all systems through one network, while production is almost autonomous.

Industry 4.0 is a production concept designed in Germany. It connects the physical world with the virtual world in order to increase the competitiveness of the German manufacturing industry. (Kagermann et al., 2011) The creation of intelligent factories was conditioned by the combination of cyber physical systems with people connected through the Internet of Things with the support of Internet services. Factory management envisaged the organization of processes through intelligent resource planning and the support of human and virtual agents in product development, with responses to demand, market conditions and feedback taking place in real time. The timeliness of the data obtained enables the continuous improvement of products, which enables companies to increase their competitiveness on the global market. (Schrauf, Bertram, 2016)

The development of Industry 4.0 resulted in the launch of a number of changes in healthcare, which used the knowledge of the industrial concept in four phases as well (Thuemmler, Bai 2017):

1. Phases - Health 1.0 (end of the 19th century to the 20th century):

- Scientific research into the causes of diseases that until then were based on superstition and speculation.
- Development of vaccines and antibiotics that have helped in prevention and treatment.
- Expanding possibilities in epidemiology and laboratory science.
- The emergence of modular information system technology.

2. Phase - Health 2.0 (80s of the 20th century):

- Development and use of new medical imaging techniques that have enabled advances in disease diagnosis.
- Electronic Health Records (EHA).
- The Institute of Medicine (IOM) defines the mission of public health.

3. Phase - Health 3.0 (Present):

- Intensive informatization and digitalization of healthcare.
- Health is becoming a commodity, and new business models are emerging in healthcare.
- Technologies, information systems, use of data restructuring the patient's environment.
- Innovations in the use of genetic information, development of implants, wearable electronics monitoring biophysical processes in the human body and their connection with HER.

4. Phase - Health 4.0 (Future):

- Cyber-physical systems - CPS in healthcare.
- Internet of Things in Healthcare.
- Internet services.

Advances in science and technology within Industry 4.0 have an impact on all areas of people's lives and society as a whole. The present study focuses its attention on its effects on health, healthcare and medicine. By seizing the opportunities of the concept, the healthcare sector has the opportunity to become more collaborative, convergent and predictive. The result is the personalization of health care and the improvement of preventable health care, which will increase the quality of life of the person monitored, e.g. indicators of healthy life expectancy, decline in avoidable mortality and others. Negative consequences are deepening inequalities in access to new treatments, moral issues in the use of genetic engineering knowledge, healthcare professionals' access to technological advances (e.g. conscientious objection), changes in the doctor-patient relationship or the safety and protection of patients' personal health data. These issues pose challenges for the future and require education of the public, policy makers and providers on the possibilities of transformation, on the modernization of existing systems, on new governance structures and the development of a coordinated collective framework.

2 Objective and methodology

The main goal of the study is to identify the barriers to the implementation of the Health 4.0 concept existing in the healthcare system of the Slovak Republic.

To achieve the goal, we used the TISM methodology, which was defined by Sushil (2012) and is derived from the concept of the ISM methodology. It models direct and transient relations between various elements.

Process:

1. Identification of barriers
In accordance with the TISM methodology, based on the analysis of 58 professional articles registered in the SCOPUS and WoS databases dealing with the issue, we identified a set of barriers that represent an obstacle in the implementation of the Health 4.0 concept in healthcare (Jain

and Raj 2016). We supplemented the obtained information with data from statistical databases of OECD, Eurostat, NCZI. Subsequently, we subjected the barriers to the evaluation of 21 experts using the Delphi method: 10 doctors, 5 nurses, 4 academic staff and 2 IT staff. Finally, we extracted 15 barriers to the implementation of the Health 4.0 concept in the healthcare system of the Slovak Republic.

- Interpretation of mutual relations between barriers and construction of structural matrix, use of symbols according to table no. 1

Table 3 Structural matrix symbols

Symbol	Relation description
V	When barrier 'a' leads to barrier 'b', but barrier 'b' does not lead to barrier 'a'
A	When barrier 'b' leads to barrier 'a', but barrier 'a' does not lead to barrier 'b'
X	When barrier 'a' leads to barrier 'b' and vice versa
O	When the relation between barriers is not relevant

Source: Sushil, 2012

- Construction of the range matrix by converting information in binary numbers 1 and 0, according to table no. 4

Table 4 Construction of a matrix and its conversion into binary numbers

Relation between barrier 'a' and barrier 'b'	Relation 'a' – 'b'	Relation 'b' – 'a'
V	1	0
A	0	1
X	1	1
O	0	0

Source: Sushil, 2012

- Subsequently, the matrix is converted according to the reachability of the target by dividing the barriers into levels. Variables reaching a value of 1 are determined for the rows, followed by the columns, and the intersection of their reachability is determined (Sushil, 2012).
- Creating a model of barriers to the implementation of Health 4.0

3 Solution

Barriers to the implementation of the Health 4.0 concept in healthcare in Slovakia (Tupá et al., 2021):

- Risk of disruption of low-skilled jobs (B1)**
 The basis of the Industry 4.0 concept are automated and robotic technologies that replace human labour in industrial production, which leads to job losses and the release of workers. The same scenario assumes Health 4.0, where vending machines and robots in health care facilities will replace the work of some health professionals, leading to a surplus of labour, which will then be laid off (Qureshi and Syed, 2014; Frey and Osborne, 2017). For example introduction of chatbots in outpatient clinics and medical facilities, robots dispensing drugs in hospitals of the World of Health network, robotic dry and wet vacuum cleaners, e-magazines and more. (World of Health, E-Time)
- Capital intensity (B2)**
 The implementation of the Health 4.0 concept requires a very high initial investment in the development of suitable infrastructure and advanced automated technologies for healthcare facilities. IoT technologies require huge capital investments, accompanied by fears of economic loss. (Kamble et al., 2018; Kamigaki et al., 2017)

In its report, the SAO SR states in most hospitals deficit budgets or significant shortcomings in the management of budgets and other management parameters. The INEKO organization has long been drawing attention to the increase in hospital debt in

connection with breaches of applicable public procurement legislation in terms of efficiency and economy. Investing in new technologies would increase their debt. It would be a modernization debt. The return on funds allocated in this way would be reflected in the long term, but more importantly, it would be linked to increasing the quality of health care provided in reducing avoidable mortality, improving preventive care with increasing life expectancy and more. An unresolved issue is the management and security of such a vast amount of data, which raises concerns about the economic losses resulting from the failure of these capital-intensive systems and technologies.

- Growing demands for a skilled workforce (B3)**
 In order to successfully implement the Health 4.0 concept, it is essential that the workforce in healthcare facilities has the required technical knowledge and skills. The operation of automated machines and robots requires further specialized training, digitalization and use of the Internet of Things, in turn, advanced technical knowledge to ensure the security of sensitive data such as clinical patient data. (Benešová and Tupa, 2017; Gehrke et al., 2015)

NCZI statistics on the staffing of medical facilities show that 25% of doctors and almost 10% of nurses and midwives of retirement age work in Slovakia (NCZI, 2018). For this age group, education in new digital technologies is challenging and there is a presumption that their introduction into everyday practice would cause them to retire from active service. The readiness of the technological workforce requires systemic changes in the education of health workers at secondary schools and universities as soon as possible, as their entry into the labour market is expected to be delayed by 4 to 10 years.

- Cyber security and privacy issues (B4)**
 Safety is one of the biggest obstacles to the successful implementation of the Health 4.0 concept. In the cloud, a large amount of confidential patient information is available online. Securing this highly sensitive private data is a key challenge for healthcare, as cyber systems are vulnerable to cyber-attacks. According to the latest studies, the solution is to work in the Edge interface, not the cloud. (Kamble et al., 2018; Alaba et al., 2017; Babiceanu and Bójtös, 2019)

In Slovakia, cyber security issues are subject to applicable legislation: Regulation (EU) 2016/679 of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data (GDPR), Personal Data Protection Act - no. 18/2018 Coll., Act on Cyber Security - no. 69/2018 Coll., From an ethical and moral point of view, it is about ensuring secrecy between the doctor and the patient.

- Insufficient IT infrastructure (B5)**
 The successful implementation of the Health 4.0 concept presupposes an advanced IT infrastructure for the full use of the Internet of Things. The absence of an efficient communication network and weak signal strength can disrupt the whole process, as continuous data security in both horizontal and vertical levels will not be ensured. One solution is to use data processing on the Edge interface, which is not so demanding on the infrastructure. (Hecklau et al., 2016; Yan et al., 2014; Pace et al., 2018). Nevertheless, the use of the possibilities of Health 4.0 presupposes access to the Internet on the part of patients as well. According to Eurostat (2019), 82% of households in Slovakia have an internet connection and two thirds of the population had basic computer skills. For households, the investment is not only the provision of internet connection but also the purchase of IT equipment (computer, tablet or telephone). For retired patients, securing the IT infrastructure to take advantage of the opportunities offered by Health 4.0 is essential.
- Insufficient motivation of health professionals (B6)**
 Insufficient number of health care workers in health care facilities, their insufficient financial remuneration and job dissatisfaction represent a fundamental obstacle to the staffing of the application of the Health 4.0 concept. (Benešová and Tupa, 2017; Gehrke et al., 2015, Bonczek et al., 2014)

SKSaPA, SLK, Think-thank institutions and others have been drawing attention to the above-mentioned problems of the Slovak healthcare system for a long time. The biggest problem of the Slovak healthcare system is the unsustainability of the staffing of medical facilities. NCZI statistics show that almost 19,000 doctors work in health care establishments, of which 4,700 are of retirement age in the case of nurses, 33,000 of them, of which more than 3,000 are of retirement age. In an international comparison, there are 3.4 doctors per 1000 inhabitants in Slovakia, which is a value at the level of the EU average, but if all doctors of retirement age left the system, there would be only 2.58 doctors per 1000 inhabitants. In the case of the nurses, the situation is even more alarming. The EU average is 8.4 nurses per 1000 inhabitants, in Slovakia it is only 5.4, without nurses of retirement age it would be 5 nurses per 1000 inhabitants. The number of graduates of secondary medical schools or universities of medicine and medical disciplines has not been declining for a long time, but their problem is their emigration to work abroad.

- Inconsistency in rules for the exchange of clinical information (B7)

Health 4.0 is a relatively new concept. The lack of uniform standards for the exchange of information, connection to digital networks and at the same time insufficient information is an obstacle to its implementation. (Christians and Liepin, 2017)

- Lack of legislation on the use of clinical data (B8)

The digitalization and functioning of health care challenge legal professionals to create a legal framework that ensures and supports the proper and safe functioning of digital technologies and artificial intelligence in health care. This requires a redesign of the system of functioning and provision of clinical healthcare, reflecting the requirements for the legal security of clinical data in the Health 4.0 concept. (Christians and Liepin, 2017; Shelbourn et al., 2005)

- Insufficient maintenance support system (B9)

The implementation of the Health 4.0 concept requires an extensive IT infrastructure (factor B5), which needs to be managed, maintained and controlled. Any disruption of the integrated process will disrupt the whole system, which is a basic requirement for the healthcare sector. It is essential to have intelligent maintenance systems that can identify the smallest deviations with an emphasis on alerting possible errors or self-healing methods to prevent malfunctions. (Lee et al., 2014)

- Political support (B10)

The present is a period that places huge demands on capabilities such as big data analysis, cloud computing / edge computing security, searching for other options in the field of the Internet of Things or services. This requires government support to create support for the implementation of Health 4.0, e.g. financial, personnel, administrative, legislative, etc. At the same time, it is important to create standards at the international level, or and at national level to assist in the free and secure exchange of information (Bonczek et al. 2014).

- Lack of clusters for physician research and development (B11)

There is a need for continuous research and development in healthcare, as physicians should be well versed in the latest diagnostic techniques and surgeries. There is therefore a requirement to build sufficient research facilities to create a network of collaborating facilities and organizations in clusters (Raghupathi and Raghupathi, 2014). Clusters in the Slovak healthcare system are a unique exception. Their creation and cooperation is essential for modern healthcare (World of Health)

- Lack of strategy for digitization of medical facilities (B12)

Some hospitals do not have their own IT infrastructure, due to which managers have difficulty using IT technologies and finding the most suitable solution. Another problem is the incompatibility of software, indicators, units and parameters used by Schröder devices (2016). In Slovakia, there is an Action Plan for Informatization and Demand Challenges of the Industrial Property Office, which, however, is general for public

administration. The strategy of health care development with an emphasis on informatization and digitalization is completely absent (Office for Investment and Informatization, 2018, Modern Health Care: The Greatest Diagnoses of Slovak Healthcare: Survey Results)

- Lack of top management support (B13)

The implementation of the Health 4.0 concept requires extensive initial investment in the construction, development and maintenance of infrastructure in healthcare facilities (factor B2). Additional costs are required to train staff (factor B3). If top management does not support the adoption of Health 4.0, this process will not be successful (Kamigaki et al., 2017). The introduction of the concept into modern healthcare in Slovakia is not a priority for the management of healthcare facilities. The support of top management is paramount for the improvement and streamlining of medical facilities. (Modern healthcare: The biggest diagnoses of Slovak healthcare: results of a survey, SAO: Results of inspections of selected healthcare facilities)

- Fragmented and non-standardized clinical data (B14)

The healthcare industry is very fragmented and rarely standardized. It is difficult for doctors, patients and managers to maintain a general overview of the various dimensions of care. (Raghupathi and Raghupathi, 2014)

- Concerns about the use of the Internet of Things and their economic return (B15)

The Internet of Things (IoT) is one of the important pillars of the Health 4.0 concept and, when used wisely, can bring great economic benefits to healthcare organizations. With the rapid expansion of wearable devices and smartphones, the combination of technology and IoT support shifts healthcare from a conventional system based on a framework approach to all patients to more personalized healthcare systems (Qi et al., 2017). However, staff are still unclear about the potential benefits and proper use of the Internet of Things in terms of value and rapid delivery of services. Several applications and technologies from IoT are still in their infancy and their results are uncertain. (Ryan and Watson, 2017; Li et al., 2015)

Table 5 Summary of barriers to the implementation of the Health 4.0 concept in the Slovak Republic

Number	Barriers to the implementation of the Health 4.0	
1	Risk of disruption of low-skilled jobs	B1
2	Capital intensity	B2
3	Growing demands for a skilled workforce	B3
4	Cyber security and privacy issues	B4
5	Insufficient IT infrastructure	B5
6	Insufficient motivation of healthcare professionals	B6
7	Inconsistency in regulations for the exchange of clinical information	B7
8	Lack of legislation on the use of clinical data	B8
9	Insufficient maintenance support system	B9
10	Political support	B10
11	Lack of clusters for physician research and development	B11
12	Lack of strategy for digitalization of medical facilities	B12
13	Lack of top management support	B13
14	Fragmented and non-standardized clinical data	B14
15	Concerns about the use of the Internet of Things and their economic return	B15

Source: own processing

Based on the evaluation of barriers to the implementation of Health 4.0 by selected experts from practice and academic

experts, we constructed an initial matrix of SSIM, which captures the evaluation of the interrelations between the criteria. (table 6)

Table 6 Structural self-interaction matrix (SSIM)

	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
B1	A	o	a	a	o	a	a	o	o	a	a	o	a	x	
B2	A	a	a	a	o	a	a	o	x	o	o	a	a		
B3	V	v	a	v	o	v	v	o	v	x	v	v			
B4	A	o	a	a	o	o	a	a	v	x	o				
B5	v	v	a	v	o	a	a	v	v	o					
B6	a	x	x	a	a	a	a	o	o						
B7	o	o	a	o	x	o	a	o							
B8	a	o	a	x	v	a	o								
B9	v	v	a	v	v	x									
B10	v	v	a	v	v										
B11	o	o	a	o											
B12	o	o	a												
B13	v	v													
B14	a														
B15															

Source: own processing

In the next step, the SSIM is converted to the binary digits of criteria 1 and 0 according to table no. 3, which is shown in

Table no. 7. as initial reachability.

Table 7 Initial reachability matrix

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15
B1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
B2	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
B3	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1
B4	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0
B5	1	0	0	0	1	0	1	1	0	0	0	1	0	1	1
B6	1	0	1	1	0	1	0	0	0	0	0	0	0	1	0
B7	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0
B8	0	0	0	1	0	0	0	1	0	0	1	1	0	0	0
B9	1	1	0	1	1	0	1	0	1	1	1	1	0	1	1
B10	1	1	0	0	1	1	0	1	1	1	1	1	0	1	1
B11	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0
B12	1	1	0	1	0	1	0	1	0	0	0	1	0	0	0
B13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B14	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
B15	1	1	0	1	0	0	0	1	0	0	0	0	0	1	1

Source: own processing

Subsequently, we evaluated the matrix in terms of transitive bonds and then divided into levels of different repetitions.

The matrix is reviewed for the transitivity links and then partitioned and the levels of different iterations (table 8).

Table 8 Iterations

	RS	AS	AS ∩ RS	LEVEL
B1	1,2,6	1,2,3,5,6,9,10,12,13,15	1,2,6	I.
B2	1,2,7	1,2,3,4,7,9,10,12,13,14,15	1,2,7	I.
B3	1,2,3,4,5,6,7,9,10,12,14,15	3,6,13	3,6	VII.
B4	2,4,6,7	3,4,6,8,9,12,13,15	4,6	II.
B5	1,5,7,8,12,14,15	3,5,9,10,13	5	V.
B6	3,4,6,14	1,3,4,6,10,11,12,13,14	3,4,6,14	I.
B7	2,7,11	2,3,4,5,7,9,11,13	2,7,11	I.
B8	4,8,11,12	5,8,10,12,13,15	8,12	III.
B9	1,2,4,5,7,9,10,11,12,14,15	3,9,10,13	9,10	VI.
B10	1,2,5,6,8,9,10,11,12,14,15	3,9,10,13	9,10	VI.
B11	6,7,11	7,8,9,10,11,13	7,11	II.
B12	1,2,4,6,8,12	3,5,8,9,10,12,13	8,12	III.
B13	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	13	13	
B14	2,6,14	3,5,6,9,10,13,14,15	6,14	II.
B15	1,2,4,8,14,15	3,5,6,9,10,13,15	15	IV.

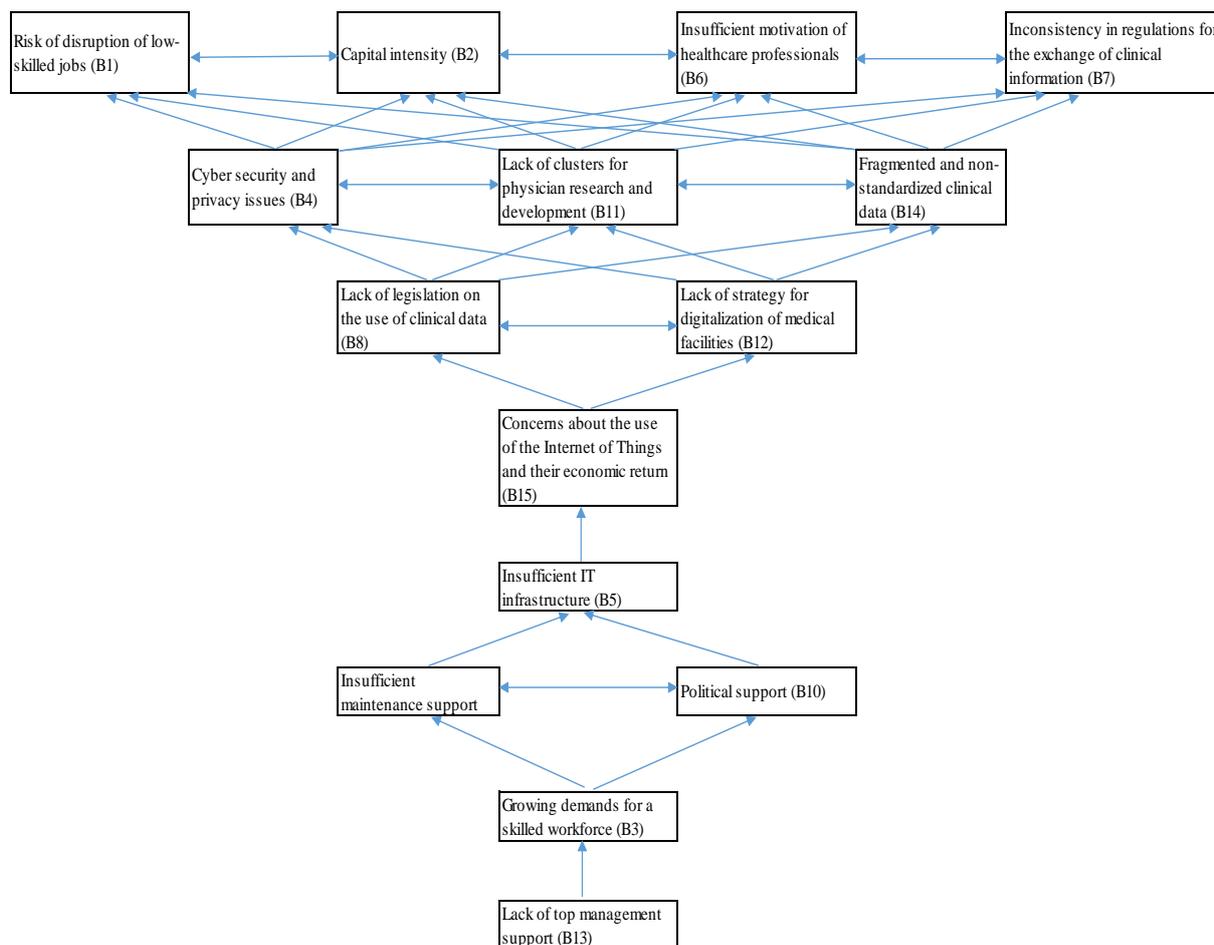
Source: own processing

Interpretive structural model was plotted (figure 2) using Iterations (Tab. 8). This model consists of eight levels.

Challenges at the higher levels have the less effective (levels 1–3) and challenges at low levels are basic and levels 7-8 have the

most effective on other challenges and the recruitment system.

Figure 2 Interpretive structural modeling-based model



Source: own processing

4 Interpretation of results

We used expert opinions on the implementation of Health 4.0 as a basis for the creation of the ISM model and the analysis of the relationships between the barriers leading to the introduction of Health 4.0 elements in the healthcare system of the Slovak Republic.

Barriers that can be considered as challenges in this model have been grouped into three categories: key challenges, strategic challenges and dependent challenges. The holistic model is logical and the relationship between barriers is a picture of important factors and the elements that depend on them.

Some of the barriers have been extracted to the lowest level: lack of top management support (B13) and growing demands for a skilled workforce (B3). These barriers represent the challenges of Health 4.0 with the greatest impact on higher level barriers. We can identify these challenges as key, and any attempts to address them can positively influence the solution of other barriers.

Political support (B10), insufficient technical support system (B9), insufficient IT infrastructure (B5) and concerns about the use of the Internet of Things and their economic return (B15) are in the middle level of the ISM model. These challenges are described as strategic due to the strong impact on the success of the implementation of Health 4.0 elements in the healthcare system of the Slovak Republic. Public policy makers influencing

health care should pay increased attention to them if their goal is to increase the quality of services provided in the health care sector in Slovakia by using the potential of this new concept. At the highest level of the ISM model, barriers arising from lower-level challenges are strongly dependent. These include: risk of undermining low-skilled jobs (B1), capital intensity (B2), insufficient motivation of health professionals (B6), inconsistencies in rules for the exchange of clinical information (B7), problems with cyber security and privacy (B4), lack of clusters for research and physician development (B11), fragmented and non-standardized clinical data (B14), lack of legislation on the use of clinical data (B8), and a lack of digitalization strategy for healthcare facilities (B12).

5 Conclusion

The elements of Health 4.0 represent an opportunity to transform the healthcare sector in the Slovak Republic from a purposefully compassionate system to a value-oriented and personalized system that can provide proactive preventive measures. The results will be reflected in the positive development of important indicators, e.g. life expectancy in health, reducing the number of avoidable deaths, increasing life expectancy at birth and others, due to increasing the quality of services provided in health care facilities. The barriers identified in this research will help public policy makers and managers of health care facilities to take concrete steps to enable the Health 4.0 program to be successfully implemented in the health care system of the Slovak Republic. The result of this study is an evaluation of key factors

according to importance. It is essential to design strategies in the long term that address high-priority barriers, thus enabling the opportunities offered by technical and technological progress to be fully exploited.

Literature:

1. Alaba, F. A.; Othman, M.; Hashem, I. A. T. & Alotaibi, F.: Internet of things security: A survey. *Journal of Network and Computer Applications*, 2017, Vol. 88, pp. 10 – 28. <https://doi.org/10.1016/j.jnca.2017.04.002>
2. Babiceanu, R. F., Seker R.: Big Data and virtualization for manufacturing cyber-physical systems: A survey of the current status and future outlook. *Computers in Industry*, 2016, Vol. 81, pp. 128-137. <https://doi.org/10.1016/j.compind.2016.02.004>
3. Benešová, A. & Tupa J.: Requirements for education and qualification of people in industry 4.0. *Procedia Manufacturing*, 2017, Vol. 11, pp. 2195–2202. <https://doi.org/10.1016/j.promfg.2017.07.366>
4. Bonczek, R. H. , Holsapple C. W. & Whinston, A. B.: *Foundations of decision support systems*. Academic Press, New York, 2014, p. 412. ISBN 9781483268729
5. Cline, G.: Industry 4.0 and industrial IoT in manufacturing: A sneak peek. 2017. [online]. [cit. 2020-10-10]. Available on: [https://www.aberdeen.com/featured/industry-4-0-industrial-iot-manufacturing-sneak-peek/#lightbox\[gallery37632\]/null](https://www.aberdeen.com/featured/industry-4-0-industrial-iot-manufacturing-sneak-peek/#lightbox[gallery37632]/null)
6. Eurostat (2019): Štatistika digitálnej ekonomiky a spoločnosti – domácnosti a jednotlivci. [online]. [cit. 2020-11-10]. Available on: https://ec.europa.eu/eurostat/statistics-explain-ed/index.php?title=Digital_economy_and_society_statistics_-_households_and_individuals/sk
7. Frey, C. B. & Osborne, M. A.: The future of employment: how susceptible are jobs to computerisation? *Technological Forecasting and Social Change*, 2017, 114 (C), pp. 254-280. <https://doi.org/10.1016/j.techfore.2016.08.019>
8. Gehrke, L.; Kühn, A.; Rule, D. , Moore, P. et al: A discussion of qualifications and skills in the factory of the future: a German and American perspective. *VDI/ ASME Industry*, 2015, 4:1–28. [online]. [cit. 2020-11-05]. Available on: https://www.researchgate.net/publication/279201790_A_Discussion_of_Qualifications_and_Skills_in_the_Factory_of_the_Future_A_German_and_American_Perspective
9. Christians, A. & Liepin, M.: The Consequences of digitalization for german civil law from the national legislator's point of view. *Zeitschrift fuer Geistiges Eigentum/Intellectual Property Journal*, 2017, Vol. 9, pp. 331–339. <http://doi.org/10.1628/186723717X15069451170900>
10. Hecklau, F., Galeitzke, M., Flachs, S., Kohl, H.: Holistic approach for human resource management in industry 4.0. *Procedia CIRP*, 2016, Vol. 54, pp. 1-6. <https://doi.org/10.1016/j.procir.2016.05.102>
11. Jain, V. & Raj, T.: Modeling and analysis of FMS performance variables by ISM. SEM and GTMA approach *International J Production Economics*, 2016, 171:84–96. <https://doi.org/10.1016/j.ijpe.2015.10.024>
12. Kagermann, H., Lukas, W. D. & Wahlster, W.: *Industrie 4.0: Mit dem Internet der Dinge auf dem Weg zur 4. industriellen Revolution*. VDI nachrichten 13. No 13, 2011. [online]. [cit. 2020-10-01]. Available on: http://www.wolfgang-wahlster.de/wordpress/wp-content/uploads/Industrie_4_0_Mit_dem_Internet_der_Dinge_auf_dem_Weg_zur_vierten_industriellen_Revolution_2.pdf
13. Kamble S., Gunasekaran, A, Sharma, R.: Analysis of the driving and dependence power of barriers to adopt industry 4.0 in Indian manufacturing industry. *Computers in Industry*, 2018, Vol. 101, pp. 107–119. <https://doi.org/10.1016/j.compind.2018.06.004>
14. Kamigaki, T.: Object-Oriented RFID with IoT. A Design Concept of Information Systems in Manufacturing. *Electronics*, 2017, Vol. 6(1):14. <https://doi.org/10.3390/elektronika6010014>
15. Lee, J., Kao, H. A. & Yang, S.: Service innovation and smart analytics for industry 4.0 and big data environment. *Procedia Cirp*, 2014, Vol. 16, pp. 3–8. <https://doi.org/10.1016/j.procir.2014.02.001>
16. Li, S., Da Xu, L. & Zhao, S. (2015). The internet of things. *A survey Information Systems Frontiers*, 2015, Vol. 17, pp. 243-259. https://doi.org/10.1007_s10796-014-9492-7
17. *Moderné zdravotníctvo 2019*. [online]. [cit. 2020-09-16]. Available on: <http://www.modernezdravotnictvo.sk/>
18. Nariadenie EP a Rady (EÚ) 2016/679 o ochrane fyzických osôb pri spracúvaní osobných údajov a o voľnom pohybe takýchto údajov (GDPR)
19. NCZI: Statistical. [online]. [cit. 2020-11-16]. Available on: http://www.nczisk.sk/Statisticke_vystupy/Zdravotnicka_rocenka/Pages/default.aspx
20. Pace, P., Aloï, G., Gravina, R., Caliciuri, G., Fortino, G., & Liotta, A.: An edge-based architecture to support efficient applications for healthcare industry 4.0. *IEEE Transactions on Industrial Informatics*, 2018, Vol. 15(1), pp. 481-489. [online]. [cit. 2020-11-22]. Available on: <https://scholar.google.com/citations?user=DLa81JMAAA&hl=en>
21. Raghupathi, W. & Raghupathi, V.: Big data analytics in healthcare: promise and potential. *Health Info Sci Syst*, 2014, 2:3. <https://doi.org/10.1186/2047-2501-2-3>
22. Ryan, P. J. & Watson, R. B.: Research challenges for the internet of things: What role can OR play? *Systems*, 2017, Vol. 5 (1), pp. 24. <https://doi.org/10.3390/systems5010024>
23. Qi, J., Yang, P., Min, G., Amft, O., Dong, F. & Xu, L. (2017). Advanced internet of things for personalised healthcare systems. *A survey, Pervasive and Mobile Computing*, 2017, Vol. 41, pp. 132-149. <https://doi.org/10.1016/j.pmcj.2017.06.018>
24. Qureshi, M. O. & Syed, R. S.: The impact of robotics on employment and motivation of employees in the service sector, with special reference to health care. *Saf Health Work*, 2014, 5(4), pp.198-202. <https://doi.org/10.1016/j.shaw.2014.07.003>
25. Schrauf, S. & Bertram, P.: *Industry 4.0: How Digitization Makes the Supply Chain More Efficient, Agile, and Customer-Focused*. Pricewaterhouse Coopers: London, UK, 2016. [online]. [cit. 2020-12-10]. Available on: <https://www.strategyand.pwc.com/gx/en/insights/2016/digitization-more-efficient.html>
26. Schröder, C.: *The challenges of industry 4.0 for small and medium-sized enterprises*. Friedrich-Ebert-Stiftung: Bonn, Germany, 2016. ISBN 978-3-95861-543-4
27. Sushil: *Flowing Stream Strategy: Managing Confluence of Continuity and Change*. *Journal of Enterprise Transformation*, 2012, 2: 26–49. <https://doi.org/10.1080/19488289.2011.650280>
28. Thuemmler, Ch. & Bai, Ch.: *Health 4.0: how virtualization and big data are revolutionizing healthcare*. Springer, New York, 2017, ISBN: 978-3-319-47617-9
29. Tupá, M., Masárová, T., Karbach, R.: Implementácia prvkov konceptu Industry 4.0 v zdravotníctve SR. In: *The Impact of Industry 4.0 on Job Creation 2020. Proceedings of scientific papers from the international scientific conference. TnUAD, Trenčín 2021*. pp. 477-487. ISBN 978-80-8075-939-1
30. Yan, Z., Zhang, P., & Vasilakos, A. V.: A Survey on Trust Management for Internet of Things. *Journal of Network and Computer Applications*, 2014, Vol. 42, pp. 120 - 134. <https://doi.org/10.1016/j.jnca.2014.01.014>
31. Zákon č. 18/2018 Z. z. o ochrane osobných údajov
32. Zákon č. 69/2018 Z. z. o kybernetickej bezpečnosti

Primary Paper Section: F

Secondary Paper Section: FQ

I INFORMATICS

IN INFORMATICS

MODELLING OF AN INTELLIGENT TRAFFIC CONTROL SYSTEM

^aAMINAH HARDWAN AHMED, ^bLUCA ZANOTTI
FRAGONARA

*School of Aerospace, Transport and Manufacturing (SATM),
Cranfield Campus, Cranfield University, College Road,
Cranfield, MK43 0AL, United Kingdom.
Email: Aminah.Ahmed@cranfield.ac.uk*

Abstract: The rapidly increasing traffic congestion is affecting the population of the world in a variety of ways including personal (physical and mental health), family, social, environmental, accidents and passage of emergency and law and order vehicles. Out of the many varieties of approaches tested for solutions, the current research used roadside sensors to collect data and use them for simulations using PTV Vissim simulator with MS Excel algorithmic optimisation. The location of the test was which St Marks Road in the Merton region of the UK. This is indeed an inlet into a major road (A217). A subset of data from the Department of Transport (2019) [1] was chosen which had an AADT of less than 2,000. In 2018, it was an AADT of 1,086 for this location. Simulation results showed the superiority of adaptive green signal timing over fixed timing signals. The simulation results were applied to optimisation to specify the green light timing requirements. Accordingly, congestion can be prevented using adaptive green signal timings. The results were discussed within the scope of many approaches used by different researchers.

Keywords: Traffic Congestion, Adaptive Intelligent Traffic Control System, Traffic Sign Detection, Traffic Light Detection

1 Introduction

Traffic congestion has become a daily experience for commuters travelling to their educational institutions, offices or to buy things from shops. Traffic on the road consists of cars, public transport vehicles like buses and vans, office vans of specific firms, school vehicles, trucks etc. In addition, emergency vehicles of police, ambulance, fire service etc. are also on the road on many occasions. During peak hours, there is a ban on trucks on main roads in most cities. Traffic load on the road is maximum during peak hours when most people want to travel on the road at the same time, using a variety of vehicles.

To ensure reaching their workplace, commuters need to start much earlier and return home very late. This leaves practically no time to attend to children or other family matters. Such daily experiences lead to mental strain, frustration and psycho-social problems. An adjustment on food habits and absence of active life with no exercise leads to physical health problems too. Thus, the effects of traffic congestion on people are many and serious. Other problems include higher probability of traffic accidents, delayed emergency works and increased probability of traffic offenses.

The reports of Inrix, as cited in Korosec [2] and Tom Tom Index [3] listed Los Angeles, Moscow, San Francisco, Atlanta, Miami, Bangkok and Mexico City as the leading cities in traffic congestion and the order of ranking may be different in other different reports. At an annual rate of 102 hours spent on roads due to congestion, the driver cost is \$2828 and the total annual cost to the city of Los Angeles alone is about \$19.2 billion directly and indirectly. The corresponding global level impact will run into several billion USD. These data demonstrate the seriousness of the problem and the need to find a solution.

There have been many research studies to find solutions. The main technologies used for solutions include sensors, road infrastructures, intelligent vehicles, GPS, GPRS, RFID, communication technologies and applications, mobile devices and applications, internet of things and cloud computing. Some of them are add on to the current systems, while others incorporate adaptive intelligent traffic control systems.

In designing an adaptive intelligent traffic control system, three types of approaches are used: infrastructure based (Barba, Mateos, Soto, Mezher, & Igartua, 2012) [4], intelligent vehicle-based (Sandhu et al, 2015) [5] and combination of both (Khekare & Sakhare, 2013) [6] in an integrated manner. The technologies mentioned above are part of the three approaches. This paper

deals with a simulation research on the integrated use of both connected vehicles and roadside units.

2 Objective

The objective of the study was to model an intelligent traffic control system, which automatically adapts its traffic control system based on a dynamic analysis of traffic input data from sensors placed on the roadsides connected with green signal timing control.

3 Material and Methods

Traffic count data (hard numbers and estimates) were obtained from the Department of Transport [1] in the UK. The dataset included traffic data for more than 800,000 locations across the UK. Additionally, the data included the following attributes: major region associated with the data collection point, local authority name, road name, road category, road type, start junction name, end junction name, the coordinates of the location, the link length, direction of travel, and a total count (AADT) of all motor vehicles by the type of vehicle.

One of the major sources of congestion on motorways/freeways/major-roads is the point of infusion of vehicles into a motorway/freeway/major-road. A subset of data from the Department of Transport [1] was chosen which had an AADT of less than 2,000. This approach was a likely to exclude all data points attached to a motorway/freeway/major-road. From this subset, a data point was randomly selected for modelling. The data point so selected was the point at which St Marks Road in the Merton region of the UK (see Figure 1). A closer look at this data collection point confirmed that this is indeed an inlet into a major road (A217). The 2018 AADT traffic counts associated with the westbound inlet was 1086.

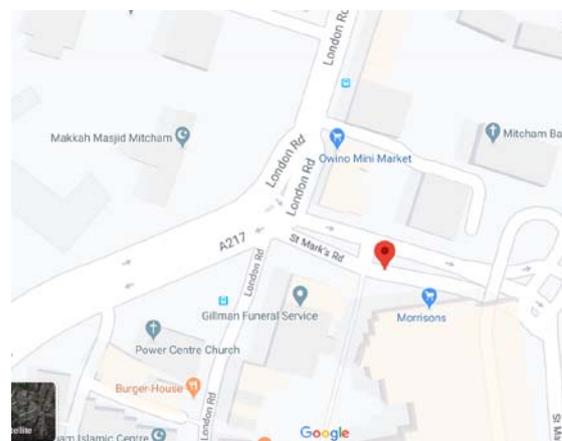


Figure 1: Selected data point for modelling

3.1 Simulation and Optimization

PTV Vissim and MS Excel software were used to model the scenario shown in Figure 2. PTV Vissim is an advanced traffic simulation proprietary software of PTV Group. Microscopic level vehicle interactions can be simulated using this software. However, one limitation is that it needs to be interfaced with some other applications like Vissim COM interface to process complex mathematical algorithms for customised applications [7]. The authors used Vissim-COM in an Indonesian traffic control case study with Vissim-Matlab interaction. Weyland, Buck, and Vortisch [8] used PTV Vissim for building and calibrating a dynamic traffic flow control to reduce emissions. Python was used as the control logic interfaced with COM for a German highway case. Shindgikar, Shahri, and Ghasemi [9] integrated PTV VISSIM and MATLAB Simulink to design and

analyse the flow of traffic in an urban traffic network using COM interface.

Use of MS Excel was reported by Nikolaev, Sapego, Jakubovich, Berner, and Ivakhnenko [10]. The procedure used was that sensors were installed on the roadway to provide the data for algorithm of incident detection. After the incident was detected, the algorithm of defining its priorities was started. The traffic flow for research was modelled in the PTV Vissim, after all receives information were uploaded to excel for further processing. A similar procedure was also described by Narasip [11] to optimise vehicle movements in mixed traffic junctions in Singapore, where heavy goods vehicles predominate slowing the traffic and by Park and Qi [12] to calibrate of simulation models. Thus, the method adopted here is a very widely used one.



Figure 2: Modelling scenario

The above figure shows an inlet into a major highway. There is a sensor installed at point A as shown in the figure which will capture the traffic flow rate (i.e., vehicles per second). The data from point A will be transmitted to the traffic signal at point B and this will inform the adaptive traffic control optimisation.

The following assumptions were made before running the simulation and optimisation:

1. The traffic flow rate is between 0 to 5 vehicles per second. This assumption is inspired from Roupail, Tarko, and Li [13] who suggested that the average traffic flow rate per second at signalised intersections is between 2-4 vehicles seconds. The traffic flow rate of 0 to 5 vehicles per second was used by taking into account and potential interruptions and changed traffic conditions between when that study was done and now.
2. The fixed green signal duration is 2 seconds and the lag between the pair of fixed green signals is a variable n seconds.
3. One vehicle can pass a green signal in 1 second.

The traffic flow rate was simulated 3 times for a period of 100 seconds each. The values simulated were between 0 to 5 vehicles per second. The results of the simulation are reported in the subsequent section.

Congestion has been computed as the cumulative difference between the vehicles per second and the duration of the fixed or adaptive traffic signal in seconds.

$$\text{Congestion} = \sum n1 (\text{TrafficFlowRate} - \text{DurationTrafficSignal})$$

Where, n ranges from 1 to n seconds.

The Generalized Reduced Gradient (GRG) Nonlinear optimisation function has been used to minimise congestion. Therefore, the objective function is:

- minimise (Congestion)

The changeable variable is the duration of the adaptive traffic signal. The constraints used are:

- Congestion ≥ 0
- $0 < \text{SignalDuration} < 5$
- SignalDuration is an integer

The results obtained from the optimisation for the three simulation scenarios are presented in the following section.

4 Results

The results of the simulation of traffic flow rate are shown in Table 1 and Figure 3 below.

Table 1: Traffic flow rate simulations

Second	Traffic Flow Rate 1	Traffic Flow Rate 2	Traffic Flow Rate 3
1	3	0	2
2	2	4	0
3	5	3	1
4	4	1	2
5	2	4	0
6	5	2	4
7	0	0	2
8	5	4	2
9	2	0	1
10	0	1	3
11	1	3	2
12	1	3	0
13	5	1	4
14	0	4	1
15	1	4	4
16	3	0	2
17	2	1	5
18	2	2	1
19	2	4	0
20	4	4	0
21	1	0	0
22	1	3	0
23	3	3	0
24	4	4	3
25	1	3	5
26	0	0	1
27	4	0	1
28	2	5	5
29	1	2	0
30	0	2	2
31	5	5	5
32	2	1	1
33	2	2	0
34	2	2	4
35	5	0	2
36	3	2	1
37	1	3	3
38	4	5	4
39	3	3	0
40	5	0	4
41	2	1	0
42	2	2	5
43	2	5	5
44	5	5	2
45	4	4	3
46	4	1	4
47	4	4	5
48	5	0	1
49	0	4	1
50	4	5	2
51	4	5	4
52	1	3	0
53	1	4	0
54	0	0	0
55	3	0	3
56	0	1	2
57	3	5	5
58	1	3	4
59	5	3	2
60	1	3	4
61	0	0	2
62	4	5	5
63	3	0	5
64	0	0	1
65	4	4	5

66	0	1	4
67	1	4	2
68	2	4	3
69	3	5	3
70	5	0	1
71	0	2	2
72	4	3	4
73	2	4	1
74	0	5	5
75	2	1	1
76	1	3	2
77	0	2	1
78	1	0	5
79	5	1	4
80	0	0	3
81	1	0	3
82	5	4	4
83	3	2	4
84	1	2	2
85	4	5	4
86	2	5	1
87	2	1	5
88	0	0	1
89	3	0	5
90	5	0	5
91	1	5	4
92	0	3	2
93	2	0	2
94	3	4	4
95	4	0	5
96	5	4	3
97	0	5	1
98	3	0	0
99	2	2	5
100	1	3	4
Mean	2.33	2.37	2.52
SD	1.71	1.81	1.75

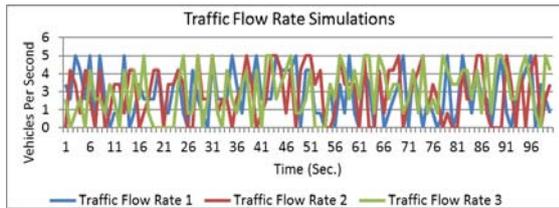


Figure 3: Traffic flow rate simulations

4.1 Fixed Signal Duration for 1 Second

The Table 2 below shows the results of the optimisation for the three scenarios for a period of 100 seconds. For each simulation, the table shows the simulated traffic flow rate per second, the duration of the fixed green signal (1 second), the amount of cumulative congestion for each second in the fixed green signal scenario, the adaptive green signal duration (i.e., the result of optimisation), and the amount of cumulative congestion for each second in the adaptive green signal scenario.

Table 2: Optimisation results

Second	Simulation 1				Simulation 2				Simulation 3						
	Traffic Flow Rate 1	Fixed Green Signal Duration (Sec.)	Congestion - Fixed Green Signal Scenario	Adaptive Green Signal Duration (Sec.)	Congestion - Adaptive Green Signal Scenario	Traffic Flow Rate 1	Fixed Green Signal Duration (Sec.)	Congestion - Fixed Green Signal Scenario	Adaptive Green Signal Duration (Sec.)	Congestion - Adaptive Green Signal Scenario	Traffic Flow Rate 1	Fixed Green Signal Duration (Sec.)	Congestion - Fixed Green Signal Scenario	Adaptive Green Signal Duration (Sec.)	Congestion - Adaptive Green Signal Scenario
1	3	1	2	3	0	0	1	0	3	0	2	1	1	3	0
2	2	1	3	3	0	4	1	3	3	1	0	1	0	3	0
3	5	1	7	3	2	3	1	5	3	1	1	1	0	3	0
4	4	1	10	3	3	1	1	5	3	0	2	1	1	3	0
5	2	1	11	3	2	4	1	8	3	1	0	1	0	3	0
6	5	1	15	3	4	2	1	9	3	0	4	1	3	3	1

7	0	1	14	3	1	0	1	8	3	0	2	1	4	3	0
8	5	1	18	3	3	4	1	11	3	1	2	1	5	3	0
9	2	1	19	3	2	0	1	10	3	0	1	1	5	3	0
10	0	1	18	3	0	1	1	10	3	0	3	1	7	3	0
11	1	1	18	3	0	3	1	12	3	0	2	1	8	3	0
12	1	1	18	3	0	3	1	14	3	0	0	1	7	3	0
13	5	1	22	3	2	1	1	14	3	0	4	1	10	3	1
14	0	1	21	3	0	4	1	17	3	1	1	1	10	3	0
15	1	1	21	3	0	4	1	20	3	2	4	1	13	3	1
16	3	1	23	3	0	0	1	19	3	0	2	1	14	3	0
17	2	1	24	3	0	1	1	19	3	0	5	1	18	3	2
18	2	1	25	3	0	2	1	20	3	0	1	1	18	3	0
19	2	1	26	3	0	4	1	23	3	1	0	1	17	3	0
20	4	1	29	3	1	4	1	26	3	2	0	1	16	3	0
21	1	1	29	3	0	0	1	25	3	0	0	1	15	3	0
22	1	1	29	3	0	3	1	27	3	0	0	1	14	3	0
23	3	1	31	3	0	3	1	29	3	0	0	1	13	3	0
24	4	1	34	3	1	4	1	32	3	1	3	1	15	3	0
25	1	1	34	3	0	3	1	34	3	1	5	1	19	3	2
26	0	1	33	3	0	0	1	33	3	0	1	1	19	3	0
27	4	1	36	3	1	0	1	32	3	0	1	1	19	3	0
28	2	1	37	3	0	5	1	36	3	2	5	1	23	3	2
29	1	1	37	3	0	2	1	37	3	1	0	1	22	3	0
30	0	1	36	3	0	2	1	38	3	0	2	1	23	3	0
31	5	1	40	3	2	5	1	42	3	2	5	1	27	3	2
32	2	1	41	3	1	1	1	42	3	0	1	1	27	3	0
33	2	1	42	3	0	2	1	43	3	0	0	1	26	3	0
34	2	1	43	3	0	2	1	44	3	0	4	1	29	3	1
35	5	1	47	3	2	0	1	43	3	0	2	1	30	3	0
36	3	1	49	3	2	2	1	44	3	0	1	1	30	3	0
37	1	1	49	3	0	3	1	46	3	0	3	1	32	3	0
38	4	1	52	3	1	5	1	50	3	2	4	1	35	3	1
39	3	1	54	3	1	3	1	52	3	2	0	1	34	3	0
40	5	1	58	3	3	0	1	51	3	0	4	1	37	3	1
41	2	1	59	3	2	1	1	51	3	0	0	1	36	3	0
42	2	1	60	3	1	2	1	52	3	0	5	1	40	3	2
43	2	1	61	3	0	5	1	56	3	2	5	1	44	3	4
44	5	1	65	3	2	5	1	60	3	4	2	1	45	3	3
45	4	1	68	3	3	4	1	63	3	5	3	1	47	3	3
46	4	1	71	3	4	1	1	63	3	3	4	1	50	3	4
47	4	1	74	3	5	4	1	66	3	4	5	1	54	3	6
48	5	1	78	3	7	0	1	65	3	1	1	1	54	3	4
49	0	1	77	3	4	4	1	68	3	2	1	1	54	3	2
50	4	1	80	3	5	5	1	72	3	4	2	1	55	3	1
51	4	1	83	3	6	5	1	76	3	6	4	1	58	3	2
52	1	1	83	3	4	3	1	78	3	6	0	1	57	3	0
53	1	1	83	3	2	4	1	81	3	7	0	1	56	3	0
54	0	1	82	3	0	0	1	80	3	4	0	1	55	3	0
55	3	1	84	3	0	0	1	79	3	1	3	1	57	3	0
56	0	1	83	3	0	1	1	79	3	0	2	1	58	3	0
57	3	1	85	3	0	5	1	83	3	2	5	1	62	3	2
58	1	1	85	3	0	3	1	85	3	2	4	1	65	3	3
59	5	1	89	3	2	3	1	87	3	2	2	1	66	3	2
60	1	1	89	3	0	3	1	89	3	2	4	1	69	3	3
61	0	1	88	3	0	0	1	88	3	0	2	1	70	3	2
62	4	1	91	3	1	5	1	92	3	2	5	1	74	3	4
63	3	1	93	3	1	0	1	91	3	0	5	1	78	3	6
64	0	1	92	3	0	0	1	90	3	0	1	1	78	3	4
65	4	1	95	3	1	4	1	93	3	1	5	1	82	3	6
66	0	1	94	3	0	1	1	93	3	0	4	1	85	3	7
67	1	1	94	3	0	4	1	96	3	1	2	1	86	3	6
68	2	1	95	3	0	4	1	99	3	2	3	1	88	3	6
69	3	1	97	3	0	5	1	103	3	4	3	1	90	3	6
70	5	1	101	3	2	0	1	102	3	1	1	1	90	3	4
71	0	1	100	3	0	2	1	103	3	0	2	1	91	3	3
72	4	1	103	3	1	3	1	105	3	0	4	1	94	3	4
73	2	1	104	3	0	4	1	108	3	1	1	1	94	3	2
74	0	1	103	3	0	5	1	112	3	3	5	1	98	3	4
75	2	1	104	3	0	1	1	112	3	1	1	1	98	3	2
76	1	1	104	3	0	3	1	114	3	1	2	1	99	3	1
77	0	1	103	3	0	2	1	115	3	0	1	1	99	3	0
78	1	1	103	3	0	0	1	114	3	0	5	1	103	5	0
79	5	1	107	3	2	1	1	114	3	0	4	1	106	5	0
80	0	1	106	3	0	0	1	113	3	0	3	1	108	5	0
81	1	1	106	3	0	0	1	112	3	0	3	1	110	5	0
82	5	1	110	3	2	4	1	115	3	1	4	1	113	5	0
83	3	1	112	3	2	2	1	116	3	0	4	1	116	5	0
84	1	1	112	3	0	2	1	117	3	0	2	1	117	5	0
85	4	1	115	3	1	5	1	121	3	2	4	1	120	5	0
86	2	1	116	3	0	5	1	125	3	4	1	1	120	5	0
87	2	1	117	3	0	1	1	125	3	2	5	1	124	5	0
88	0	1	116	3	0	0	1	124	3	0	1	1	124	5	0
89	3	1	118	3	0	0	1	123	3	0	5	1	128	5	0
90	5	1	122	3	2	0	1	122	3	0	5	1	132	5	0
91	1	1	122	3	0	5	1	126	3	2	4	1	135	5	0
92	0	1	121	3	0	3	1	128	3	2	2	1	136	5	0
93	2	1	122	3	0	0	1	127	3	0	2	1	137	5	0
94	3	1	124	3	0	4	1	130	3	1	4	1	140	5	0
95	4	1	127	3	1	0	1	129	3	0	5	1	144	5	0
96	5	1	131	3	3	4	1	132	3	1	3	1	146	5	0
97	0	1	130	3	0	5	1	136	3	3	1	1	146	5	0
98	3	1	132	3	0	0	1	135	3	0	0	1	145	5	0
99	2	1	133</												

The above results clearly show that congestion is frequent with fixed green signal simulation and adaptive green signal leads almost to a no congestion situation.

4.2 Fixed Signal Duration of 2 Seconds

Table 3 below shows the results of the optimisation for the three scenarios for a period of 100 seconds. For each simulation, the table shows the simulated traffic flow rate per second, the duration of the fixed green signal (2 seconds), the amount of cumulative congestion for each second in the fixed green signal scenario, the adaptive green signal duration (i.e., the result of optimisation), and the amount of cumulative congestion for each second in the adaptive green signal scenario. The simulation results led to the optimisation results given in Table 3.

Table 3: Optimisation results

Second	Simulation 1				Simulation 2				Simulation 3						
	Traffic Flow Rate 1	Fixed Green Signal Duration (Sec.)	Congestion - Fixed Green Signal Scenario	Adaptive Green Signal Duration (Sec.)	Congestion - Adaptive Green Signal Scenario	Traffic Flow Rate 1	Fixed Green Signal Duration (Sec.)	Congestion - Fixed Green Signal Scenario	Adaptive Green Signal Duration (Sec.)	Congestion - Adaptive Green Signal Scenario	Traffic Flow Rate 1	Fixed Green Signal Duration (Sec.)	Congestion - Fixed Green Signal Scenario	Adaptive Green Signal Duration (Sec.)	Congestion - Adaptive Green Signal Scenario
1	3	2	1	3	0	0	2	0	3	0	2	2	0	3	0
2	2	2	1	3	0	4	2	2	3	1	0	2	0	3	0
3	5	2	4	3	2	3	2	3	3	1	1	2	0	3	0
4	4	2	6	3	3	1	2	2	3	0	2	2	0	3	0
5	2	2	6	3	2	4	2	4	3	1	0	2	0	3	0
6	5	2	9	3	4	2	2	4	3	0	4	2	2	3	1
7	0	2	7	3	1	0	2	2	3	0	2	2	2	3	0
8	5	2	10	3	3	4	2	4	3	1	2	2	2	3	0
9	2	2	10	3	2	0	2	2	3	0	1	2	1	3	0
10	0	2	8	3	0	1	2	1	3	0	3	2	2	3	0
11	1	2	7	3	0	3	2	2	3	0	2	2	2	3	0
12	1	2	6	3	0	3	2	3	3	0	0	2	0	3	0
13	5	2	9	3	2	1	2	2	3	0	4	2	2	3	1
14	0	2	7	3	0	4	2	4	3	1	1	2	1	3	0
15	1	2	6	3	0	4	2	6	3	2	4	2	3	3	1
16	3	2	7	3	0	0	2	4	3	0	2	2	3	3	0
17	2	2	7	3	0	1	2	3	3	0	5	2	6	3	2
18	2	2	7	3	0	2	2	3	3	0	1	2	5	3	0
19	2	2	7	3	0	4	2	5	3	1	0	2	3	3	0
20	4	2	9	3	1	4	2	7	3	2	0	2	1	3	0
21	1	2	8	3	0	0	2	5	3	0	0	2	0	3	0
22	1	2	7	3	0	3	2	6	3	0	0	2	0	3	0
23	3	2	8	3	0	3	2	7	3	0	0	2	0	3	0
24	4	2	10	3	1	4	2	9	3	1	3	2	1	3	0
25	1	2	9	3	0	3	2	10	3	1	5	2	4	3	2
26	0	2	7	3	0	0	2	8	3	0	1	2	3	3	0
27	4	2	9	3	1	0	2	6	3	0	1	2	2	3	0
28	2	2	9	3	0	5	2	9	3	2	5	2	5	3	2
29	1	2	8	3	0	2	2	9	3	1	0	2	3	3	0
30	0	2	6	3	0	2	2	9	3	0	2	2	3	3	0
31	5	2	9	3	2	5	2	12	3	2	5	2	6	3	2
32	2	2	9	3	1	1	2	11	3	0	1	2	5	3	0
33	2	2	9	3	0	2	2	11	3	0	0	2	3	3	0
34	2	2	9	3	0	2	2	11	3	0	4	2	5	3	1
35	5	2	12	3	2	0	2	9	3	0	2	2	5	3	0
36	3	2	13	3	2	2	2	9	3	0	1	2	4	3	0
37	1	2	12	3	0	3	2	10	3	0	3	2	5	3	0
38	4	2	14	3	1	5	2	13	3	2	4	2	7	3	1
39	3	2	15	3	1	3	2	14	3	2	0	2	5	3	0
40	5	2	18	3	3	0	2	12	3	0	4	2	7	3	1
41	2	2	18	3	2	1	2	11	3	0	0	2	5	3	0
42	2	2	18	3	1	2	2	11	3	0	5	2	8	3	2
43	2	2	18	3	0	5	2	14	3	2	5	2	11	3	4
44	5	2	21	3	2	5	2	17	3	4	2	2	11	3	3
45	4	2	23	3	3	4	2	19	3	5	3	2	12	3	3
46	4	2	25	3	4	1	2	18	3	3	4	2	14	3	4
47	4	2	27	3	5	4	2	20	3	4	5	2	17	3	6
48	5	2	30	3	7	0	2	18	3	1	1	2	16	3	4
49	0	2	28	3	4	4	2	20	3	2	1	2	15	3	2
50	4	2	30	3	5	5	2	23	3	4	2	2	15	3	1
51	4	2	32	3	6	5	2	26	3	6	4	2	17	3	2
52	1	2	31	3	4	3	2	27	3	6	0	2	15	3	0
53	1	2	30	3	2	4	2	29	3	7	0	2	13	3	0

54	0	2	28	3	0	0	2	27	3	4	0	2	11	3	0
55	3	2	29	3	0	0	2	25	3	1	3	2	12	3	0
56	0	2	27	3	0	1	2	24	3	0	2	2	12	3	0
57	3	2	28	3	0	5	2	27	3	2	5	2	15	3	2
58	1	2	27	3	0	3	2	28	3	2	4	2	17	3	3
59	5	2	30	3	2	3	2	29	3	2	2	2	17	3	2
60	1	2	29	3	0	3	2	30	3	2	4	2	19	3	3
61	0	2	27	3	0	0	2	28	3	0	2	2	19	3	2
62	4	2	29	3	1	5	2	31	3	2	5	2	22	3	4
63	3	2	30	3	1	0	2	29	3	0	5	2	25	3	6
64	0	2	28	3	0	0	2	27	3	0	1	2	24	3	4
65	4	2	30	3	1	4	2	29	3	1	5	2	27	3	6
66	0	2	28	3	0	1	2	28	3	0	4	2	29	3	7
67	1	2	27	3	0	4	2	30	3	1	2	2	29	3	6
68	2	2	27	3	0	4	2	32	3	2	3	2	30	3	6
69	3	2	28	3	0	5	2	35	3	4	3	2	31	3	6
70	5	2	31	3	2	0	2	33	3	1	1	2	30	3	4
71	0	2	29	3	0	2	2	33	3	0	2	2	30	3	3
72	4	2	31	3	1	3	2	34	3	0	4	2	32	3	4
73	2	2	31	3	0	4	2	36	3	1	1	2	31	3	2
74	0	2	29	3	0	5	2	39	3	3	5	2	34	3	4
75	2	2	29	3	0	1	2	38	3	1	1	2	33	3	2
76	1	2	28	3	0	3	2	39	3	1	2	2	33	3	1
77	0	2	26	3	0	2	2	39	3	0	1	2	32	3	0
78	1	2	25	3	0	0	2	37	3	0	5	2	35	5	0
79	5	2	28	3	2	1	2	36	3	0	4	2	37	5	0
80	0	2	26	3	0	0	2	34	3	0	3	2	38	5	0
81	1	2	25	3	0	0	2	32	3	0	3	2	39	5	0
82	5	2	28	3	2	4	2	34	3	1	4	2	41	5	0
83	3	2	29	3	2	2	2	34	3	0	4	2	43	5	0
84	1	2	28	3	0	2	2	34	3	0	2	2	43	5	0
85	4	2	30	3	1	5	2	37	3	2	4	2	45	5	0
86	2	2	30	3	0	5	2	40	3	4	1	2	44	5	0
87	2	2	30	3	0	1	2	39	3	2	5	2	47	5	0
88	0	2	28	3	0	0	2	37	3	0	1	2	46	5	0
89	3	2	29	3	0	0	2	35	3	0	5	2	49	5	0
90	5	2	32	3	2	0	2	33	3	0	5	2	52	5	0
91	1	2	31	3	0	5	2	36	3	2	4	2	54	5	0
92	0	2	29	3	0	3	2	37	3	2	2	2	54	5	0
93	2	2	29	3	0	0	2	35	3	0	2	2	54	5	0
94	3	2	30	3	0	4	2	37	3	1	4	2	56	5	0
95	4	2	32	3	1	0	2	35	3	0	5	2	59	5	0
96	5	2	35	3	3	4	2	37	3	1	3	2	60	5	0
97	0	2	33	3	0	5	2	40	3	3	1	2	59	5	0
98	3	2	34	3	0	0	2	38	3	0	0	2	57	5	0
99	2	2	34	3	0	2	2	38	3	0	5	2	60	5	0
100	1	2	33	3	0	3	2	39	3	0	4	2	62	5	0

5 Conclusion

A summary of the findings is provided in the Table 4 below.

The results show that the amount of congestion when the fixed green signal duration is 1 second for simulation 1 was 133 vehicles, for simulation 2 it was 138 vehicles and for signal 3 it was 152 vehicles. The amount of congestion for the adaptive green signal approach was 0 vehicles for all the simulations.

The results show that the amount of congestion when the fixed green signal duration is 2 seconds for simulation 1 was 34 vehicles, for simulation 2 it was 39 vehicles and for signal 3 it was 62 vehicles. The amount of congestion for the adaptive green signal approach was 0 vehicles for all the simulations.

This indicates that adaptive green signals or intelligent traffic control out performs fixed green signal approach in all instances. Given the low traffic flow rate of 1,086 AADT on St Marks Road in Merton, it is safe to claim that replacing fixed green signals by adaptive green signals would eliminate any potential congestion at that point.

Table 4: Optimisation results summary

Fixed Green Signal Duration of 1 Second	Simulation 1	Simulation 2	Simulation 3
Congestion - Fixed Green Signal Scenario	133	138	152
Congestion - Adaptive Green Signal Scenario	0	0	0
Fixed Green Signal Duration of 2 Seconds	Simulation 1	Simulation 2	Simulation 3
Congestion - Fixed Green Signal Scenario	34	39	62
Congestion - Adaptive Green Signal Scenario	0	0	0

6 Discussion

Usefulness of adaptive signals with neural networks and genetic algorithm to reduce congestion was demonstrated by Kaur and Agrawal [14]. In this work, only roadside sensors were used to transmit traffic data to the signalling system at the junction and optimisation algorithm was used for applying the data for reducing congestion. A wide range of approaches which basically uses automatic signalling system for congestion control have been proposed by various researchers. Some of the more recent ones are cited here. These works largely support the findings of this research at the same time provides other types of solutions which can be researched in future in continuity with this work. For example, Gao, Shen, Liu, Ito, and Shiratori [15] proved the value of the precise algorithms in such contexts. Such adaptive signalling for traffic control can be extended to through a unity parameter to serially integrate signal timings in multiple intersections [16]. Use of reinforcement learning has become an integral part of roadside sensor based adaptive signal control to reduce congestion as reviewed by Mannion, Duggan, and Howley [17]. A tree-like configuration of a decision-making model was suggested by Sadollah, Gao, Zhang, Zhang, and Su [18] to reduce traffic congestion at intersections using adaptive traffic signals. Different traffic networks with different sizes, varying from nine to 400 intersections were tested to validate the model. Multi-agent reinforcement learning (MARL) approach has also been used with automatic signalling systems for effective traffic control [19]. The availability of a variety of methods to acquire traffic data for use in intelligent traffic signal control systems was highlighted in a recent review by Wang, Yang, Liang, and Liu [20]. These methods include information technologies on computing science, autonomous driving, vehicle-to-vehicle, and mobile Internet. Since these were not used in this study, more works related to them are not considered to support the findings here. Future research may be on self-adaptive systems using integrated systems of vehicle-based and infrastructure-based technologies.

7 Limitations of This Research

The results may be very specifically applicable to intersections of a by-lane entering a main road. More work needs to be done to extend this to real time situations and to multiple intersections. No attempt was made for modelling and prediction although long term data were available. Other aspects like emission control were not included in the variables. Integrating roadside sensors with sensors in vehicles was not attempted but can be considered in future research when extending to multiple intersections.

8 Future Research and Proof of Concept

Future research can look into extending the simulations to a more complex scenario, for example, the effect of implementing adaptive traffic control signals on all inlets of a major road. Such an exercise can help with macro level transport planning for a city or a region within a city.

Also, the results from this analysis can be tested by a real life implementation of an adaptive traffic control signal through a pilot project.

Literature:

1. Department of Transport. *GB Road Traffic Counts*. (2019, May 29). Retrieved Mar 29 Feb 2020, 2020, from data.gov.uk: <https://data.gov.uk/dataset/208c0e7b-353f-4e2d-8b7a-1a7118467acc/gb-road-traffic-counts>
2. Korosec, K. *The 10 Most Congested Cities in the World*. (2018, February 6). Retrieved February 19, 2019, from Fortune: <http://fortune.com/2018/02/06/most-congested-cities-worst-traffic/>
3. Tom, T. *Tom Tom Traffic Index*, 2017. Retrieved February 19, 2019, from Tom Tom: https://www.tomtom.com/en_gb/trafficindex/list?citySize=LARGE&continent=ALL&country=ALL
4. Barba, C. T., Mateos, M. A., Soto, P. R., Mezher, A. M., & Igartua, M. A. (2012, June). *Smart city for VANETs using warning messages, traffic statistics and intelligent traffic lights*.

In 2012 IEEE intelligent vehicles symposium (pp. 902-907). IEEE.

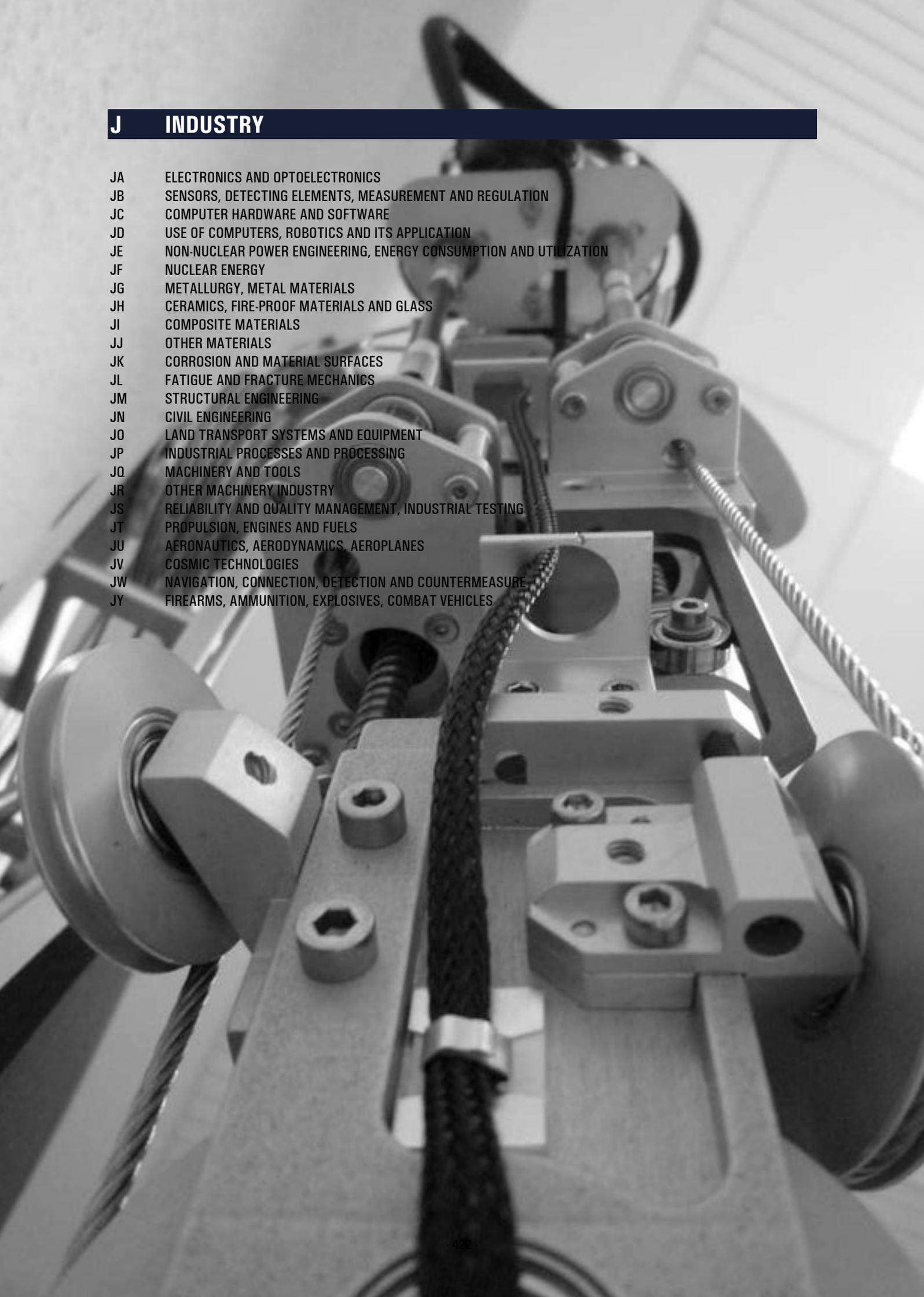
5. Sandhu, S. S., Jain, N., Gaurav, A., & Narayana Iyenger, N. C. S. (2015). Agent based intelligent traffic management system for smart cities. *Int. J. Smart Home*, 9(12), 307-316.
6. Khokare, G. S., & Sakhare, A. V. (2013, March). *A smart city framework for intelligent traffic system using VANET*. In 2013 International Mutli-Conference on Automation, Computing, Communication, Control and Compressed Sensing (iMac4s) (pp. 302-305). IEEE.
7. Ramadhan, S. A., Joeliando, E., & Sutarto, H. Y. Simulation of Traffic Control Using Vissim-COM Interface. *Internetworking Indonesia Journal*, 2019, 11(1), 55-61. Retrieved July 25, 2020, from https://www.researchgate.net/profile/Herman_Sutarto2/publication/333659545_Simulation_of_Traffic_Control_Using_VissimCOM_Interface/links/5cfb0354299bf13a3845884f/Simulation-of-Traffic-Control-Using-VissimCOM-Interface.pdf
8. Weyland, C. M., Buck, H. S., & Vortisch, P. The Potential for Traffic Emission Reduction on Freeways with Dynamic Line Control System analyzed with PTV Vissim. 2019, 6th International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS), 2019, 5-7 June 2019 Cracow, Poland, Poland, (pp. 1-9). IEEE. doi:10.1109/MTITS.2019.8883383
9. Shindgikar, S. C., Shahri, P. K., & Ghasemi, A. H. *Modelling and Control of Multi-Vehicle Traffic Networks Using an Integrated VISSIM-Matlab Simulation Platform*. 2020, University of North Carolina Charlotte. WCX SAE World Congress Experience.
10. Nikolaev, A. B., Sapego, Y. S., Jakubovich, A. N., Berner, L. I., & Ivakhnenko, A. M. Simulation of Automatic Incidents Detection Algorithm on the Transport Network. *International Journal of Environmental and Science Education*, 2016, 11(16), 9060-9078. Retrieved July 25, 2020, from <https://files.eric.ed.gov/fulltext/EJ1118963.pdf>
11. Narasip, N. R. *Study of vehicle movements in mixed traffic flow at junctions*. Nanyang Technological University, 2014. Retrieved July 25, 2020, from <https://dr.ntu.edu.sg/handle/10356/60047>
12. Park, B., & Qi, H. Development and Evaluation of a Procedure for the Calibration of Simulation Models. *Transportation Research Record*, 2005, 1934(1), 208-217. doi:10.1177/0361198105193400122
13. Roupail, N., Tarko, A., & Li, J. *Traffic flow at signalized intersections*. 1992. Retrieved from <https://www.fhwa.dot.gov/publications/research/operations/tft/chap9.pdf>
14. Kaur, T., & Agrawal, S. Adaptive traffic lights based on hybrid of neural network and genetic algorithm for reduced traffic congestion. *Recent Advances in Engineering and Computational Sciences (RAECS)*, 6-8 March 2014, Chandigarh, India (pp. 1-5). IEEE. doi:10.1109/RAECS.2014.6799655
15. Gao, J., Shen, Y., Liu, J., Ito, M., & Shiratori, N. Adaptive traffic signal control: Deep reinforcement learning algorithm with experience replay and target network. *arXiv*, 2017, 1705(May), 02755v1. Retrieved July 25, 2020, from <https://arxiv.org/pdf/1705.02755.pdf>
16. Li, T., Zhao, D., & Yi, J. Adaptive dynamic programming for multi-intersections traffic signal intelligent control. *11th International IEEE Conference on Intelligent Transportation Systems, 12-15 Oct. 2008, Beijing, China* (pp. 286-291). IEEE. doi:10.1109/ITSC.2008.4732718
17. Mannion, P., Duggan, J., & Howley, a. E. An experimental review of reinforcement learning algorithms for adaptive traffic signal control. In T. McCluskey, A. Kotsialos, J. Müller, F. Klügl, O. Rana, & R. Schumann (Eds.), *Autonomic road transport support systems 2016*; pp. 47-66. Birkhäuser, Cham. doi:10.1007/978-3-319-25808-9_4
18. Sadollah, A., Gao, K., Zhang, Y., Zhang, Y., & Su, R. Management of traffic congestion in adaptive traffic signals using a novel classification-based approach. *Engineering Optimization*, 2019, 51(9), 1509-1528. doi:10.1080/0305215X.2018.1525708
19. El-Tantawy, S., Abdulhai, B., & Abdelgawad, H. Multiagent reinforcement learning for integrated network of

adaptive traffic signal controllers (MARLIN-ATSC): methodology and large-scale application on downtown Toronto. *IEEE Transactions on Intelligent Transportation Systems*, 2013, 14(3), 1140-1150. doi:10.1109/TITS.2013.2255286

20. Wang, Y., Yang, X., Liang, H., & Liu, Y. A review of the self-adaptive traffic signal control system based on future traffic environment. *Journal of Advanced Transportation*, 2018, 1096123.

Primary Paper Section: I

Secondary Paper Section: AP



J INDUSTRY

JA	ELECTRONICS AND OPTOELECTRONICS
JB	SENSORS, DETECTING ELEMENTS, MEASUREMENT AND REGULATION
JC	COMPUTER HARDWARE AND SOFTWARE
JD	USE OF COMPUTERS, ROBOTICS AND ITS APPLICATION
JE	NON-NUCLEAR POWER ENGINEERING, ENERGY CONSUMPTION AND UTILIZATION
JF	NUCLEAR ENERGY
JG	METALLURGY, METAL MATERIALS
JH	CERAMICS, FIRE-PROOF MATERIALS AND GLASS
JI	COMPOSITE MATERIALS
JJ	OTHER MATERIALS
JK	CORROSION AND MATERIAL SURFACES
JL	FATIGUE AND FRACTURE MECHANICS
JM	STRUCTURAL ENGINEERING
JN	CIVIL ENGINEERING
JO	LAND TRANSPORT SYSTEMS AND EQUIPMENT
JP	INDUSTRIAL PROCESSES AND PROCESSING
JQ	MACHINERY AND TOOLS
JR	OTHER MACHINERY INDUSTRY
JS	RELIABILITY AND QUALITY MANAGEMENT, INDUSTRIAL TESTING
JT	PROPULSION, ENGINES AND FUELS
JU	AERONAUTICS, AERODYNAMICS, AEROPLANES
JV	COSMIC TECHNOLOGIES
JW	NAVIGATION, CONNECTION, DETECTION AND COUNTERMEASURE
JY	FIREARMS, AMMUNITION, EXPLOSIVES, COMBAT VEHICLES

STRENGTH CALCULATION OF FIXED JOINTS APPLIED IN PASSENGER CARS

^aSILVIA MALÁKOVÁ, ^bSAMUEL SIVÁK, ^cANNA GUZANOVÁ, ^dROBERT GREGA,

Faculty of Mechanical Engineering, Technical University of Košice, Letná 9, 042 00, Košice, Slovakia
 email: ^asilvia.malakova@tuke.sk, ^bsamuel.sivak@tuke.sk, ^canna.guzanova@tuke.sk, ^drobert.grega@tuke.sk

This work is a part of these projects VEGA 1/0154/19 "Research of the combined technologies of joining dissimilar materials for automotive industry" and 029TUKÉ-4/2021 "Implementation of modern educational approaches in the design of transmission mechanisms".

Abstract: The paper describes mechanical joining methods used in car body production. The automotive industry is a decisive industry and a driving force for the development of the Slovak economy. Mechanical connecting is the most widely used method of connecting materials. Joints are a critical factor in the production, assembly and service of cars. The joining in car body is mainly used to join material with various thicknesses, mechanical properties, surface coatings, even ferrous or non-ferrous metals. Many requirements are placed on the body of the car, the important thing is sufficient stiffness of the structure under the given stress. The paper deals mainly with welded and glued joints in the design of automotive structures and their strength analysis using the finite element method.

Keywords: welded joints, glued joints, car body, FEM.

1 Introduction

The automotive industry is a decisive industry and a driving force for the development of the Slovak economy. The effort of designers in the automotive industry is to use a material that would meet the lowest possible weight without compromising the safety of the crew, ideally with the lowest possible production costs. The purpose of all regulations is to ensure the greatest possible operational safety of the vehicle, therefore the car body is a complex product [1, 2]. Many requirements are placed on the car body, such as sufficient rigidity of the structure (stress, safety and durability), minimal weight (material saving), protection of crew and cargo from weather conditions (closed car body), small vibrations, good view for driver, minimizing noise emissions inside the car body, easy and fast assembly and disassembly of damaged car body elements [3].

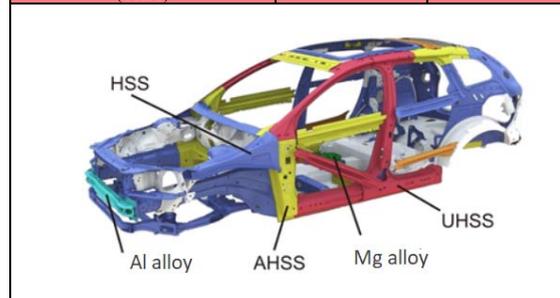
Reducing car body weight is one of the main goals in car body design. We do not encounter such a variety of materials used for car body construction anywhere else in any mass-produced engineering product. The construction of a car is made up mostly by steel of various qualities and properties. Steel makes up more than 80% of a car's construction [4]. Table 1 shows selected steels that are used in the automotive industry, although it should be noted that there is no categorization of unconventional automotive steels yet. Thanks to its properties, steel is a suitable material for car bodies construction, and thanks to its low price (compared to other suitable materials), it is also the most used material. Recently, extremely strong steel is also used - this type of steel differs from the others in that it is not made to achieve a specific chemical composition, but to achieve certain properties [5 – 8]. This type of steel also became the basis of ULSAB (Ultralight Steel Auto Body), which is basically a program aimed at demonstrating the properties of this type of steel, and the results are quite positive - 19% weight reduction, increased strength all together at a reasonable cost.

In 1970, plastics accounted for 6% of the car's weight, nowadays this share has increased to 25%. As the number of vehicles produced grew, so did the total consumption of materials. The average weight of road motor vehicles has been declining since the 1970s. The average European vehicle weighs almost 1,100 kg, with ferrous metals (60%), non-ferrous metals in particular aluminum (7%), plastics (10%), rubber (4.5%), glass (3%), textiles and anti-noise mass (4%), paint and putty (1.5%), liquids and other materials (7%). The material currently represents 30% of the production cost, so there is a great effort by manufacturers to reduce its consumption [9]. A favorable argument for the use of plastics in car production is the recyclability of all thermoplastics. At present, up to 90% of extracted oil is used for

fuel production and only 10% of oil is processed in plastics production. Plastics are an environmentally friendly solution for car production and make a significant contribution to reduction of CO₂ emissions.

Table 1. Selected steels used in the automotive industry

Strength class	Yield strength Re [Mpa]	Fortress limit Rm [Mpa]
Steel with low strength	< 210	< 340
High-speed steel (HSS)	210 - 550	270 - 700
Advanced High-Strength Steels (AHSS)	> 550	590 - 980
Ultrahigh-Strength Steels (UHSS)	> 550	> 980



The development of nanotechnologies and the decline in the price of nanocomposite materials with new possibilities for industrial production have influenced the construction of cars [10]. Due to the rapid development of nanocomposite polymeric materials, new materials with "tailor-made" higher mechanical and surface properties, and non-flammability have been created, the application of which has revolutionized automobile production. At the same time, new technological procedures were created in the production of car bodies, which made it possible to produce precise and also very complexly shaped parts from plastics with high resistance to the effects of mechanical stress in the event of an impact, resp. with very high impact strength. Plastics in conjunction with nanotechnologies in automotive manufacturing expand the range of properties of used plastics and textiles. Nanotechnological processes of the used plastics are often associated with high hydrophobic properties of exotic plants, which are referred to as the lotus effect [11, 12]. In automotive construction, physical properties of used nanocomposite polymeric materials are improved mechanical strength, improved abrasion and scratch resistance, reduced friction, dirt repellency, and anti-reflective character. These properties offer a wide range of possibilities for introducing innovations in car construction, including the use of nanoparticle-reinforced plastics, scratch-resistant paints, non-fogging surfaces, e.g., glass and anti-reflective surfaces, e.g., dashboard cover.

The use of plastics is also associated with innovations that are intended to increase safety, comfort and increase environmental friendliness. At present and also in the near future, the use of special composite reinforcement materials in car bumpers is expected, which show three times higher rigidity and energy absorption than ordinary plastic. Plastic headrests contribute to greater passenger safety [13]. In the event of a kickback, the front half of the headrest moves forward as a result of activation, reducing the risk of personal injury in the car. The main use of new materials or existing materials by replacing e.g., metals require a number of tests and experiments of their effective and efficient use. New trends in car development are focused on the use of new, lightweight or composite materials, for special surface treatments of car bodies, the use of light metal structures as well as for increasing the share of plastics for the assembly of modern types of cars. From the production-technical point of view, plastic composites filled with natural fibers of flax, cotton or sisal proved to be the best. By using these composites, great profile stability of the manufactured parts, their good impact

safety, minimal emissions in the interior and high dimensional freedom are achieved.

In recent decades, great efforts have been devoted to the research and development of unconventional materials, mainly of composite materials [14, 15]. Due to the large prevalence of composite materials, there is also a growing need to combine them with other materials, such as metals. The reason for connecting may be increasingly demanding requirements for the mechanical properties of structures, which would not meet these materials separately.

Time plays an important role in car construction. Therefore, the aim is to use the most effective - the fastest ways of joining materials in the production of automotive parts, or in the construction of the entire car body. However, the speed of joining materials and welding must not increase at the expense of the quality of joints and welds [16 - 18]. Automotive production is one of the driving forces of the growth of the world economy. The production of some of the crucial parts of cars - axles and other chassis parts, but especially complete car bodies is based on the wide use of welding and joining technologies. The car body is considered to be a thin-walled construction, which should guarantee car users a high degree of safety while applying the trends of material and energy savings. The production of cars with lower weight and thus with lower fuel consumption, follows the ecological requirements of reducing materials of various thicknesses and qualities (projects of ultralight steel car body - ULSAB), whether plated or unplated, but also the connecting of ferrous and non-ferrous metals. Their application in the automotive industry opens new opportunities for designers. These consist in the optimal use of the properties of different types of sheets, which can be combined into one unit and thus affect the strength, stiffness or resistance to corrosion and resistance to chemical aging in different parts of the mold.

2 Application of joining materials in the automotive industry

In the automotive industry, it is necessary to combine materials of various qualities and thicknesses, whether plated or unplated, but also ferrous and non-ferrous metals. Thus, in addition to traditional steel, wider use is given to aluminum, carbon, magnesium, high-strength steel and also plastics. With conventional methods of connecting materials, such as spot resistance welding or laser welding, it is not always possible to ensure the required quality of joints. That is why companies are exploring alternative methods of joining materials.

Conventional methods of joining materials in the automotive industry include welding, laser welding, soldering, and gluing.

In practice, unconventional methods of joining materials in the automotive industry are used. Such mechanical, unconventional methods include, for example, the Clinching, ClinchRivet (CR) circular press, and the Self-Piercing Riveting (SPR) circular press.

Joints are a critical factor in the production, assembly and service of cars. Each joint causes disruption of the geometric structure of the material, both in composite and other types of materials. These discontinuities cause load transfer problems and increase in stresses at critical points in the material. This, in addition to reducing the service life of the material, also causes an increase in noise and vibration.

Mechanical connecting is the most widely used method of connecting materials. However, it has many disadvantages. These disadvantages are, for example, the increase in the weight of the structures due to the need to enlarge the joints, the stress concentration at the joints, the risk of galvanic corrosion (especially in the case of CFRP), the possibility of delamination in the production of holes, differences in thermal expansion of different types of joined materials. The main advantages of this type of material connections include the possibility of disassembly of the connected parts.

The adhesive method of joining materials (gluing) has experienced great development in recent years. This is mainly due to the availability of new high-performance mixtures based on polymers, which properties can be changed according to the specific requirements for individual types of connected materials. By bonding with adhesive mixtures, a longer service life of the connected parts can be achieved compared to parts connected by mechanical connections, which is related to the transfer of load from material to material along the entire length of the connection without discontinuity in these materials. This type of connection provides good sealing properties. Thanks to the flexibility of the adhesive mixtures, it is possible to reduce vibration and noise and also to optimize the strength characteristics of the connected structures. Disadvantages of adhesive connecting include the inability to disassemble connected parts and the need to prepare the surfaces of connected materials.

Welding technology is mainly associated with metallic materials. However, there are also polymeric composite materials (thermoplastic matrix composites) that can be connected by this technology. The advantages of welding are good mechanical properties and resistance of joints, short processing time and minimal need to prepare connected surfaces. The main disadvantages of this type of connection for composite materials are the restriction exclusively to thermoplastic materials, problems with the disassembly of connected parts and the presence of foreign substances in the structures of materials needed for individual types of welding (induction, resistance, ultrasonic). Laser welding is also increasingly used in the automotive industry (Fig. 1).

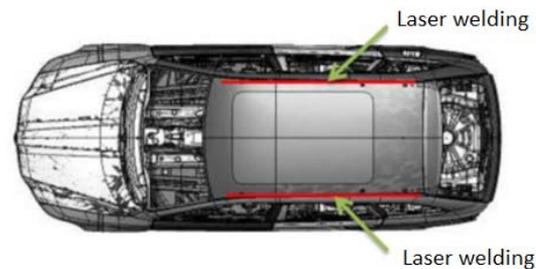


Figure 1. Laser welding on the roof of the car

Glued joints appear in the automotive industry in many types, both in terms of functional stress and in terms of design. It can be said that the bonding either acts as a complementary and sealing function (bonding and cementing of bodies for sealing, vibration damping, corrosion protection, application of reinforcements) or, in specific cases, can generally represent welding technology in structural strength joints [5]. Some applications of glued joints can be seen in Figure 2.

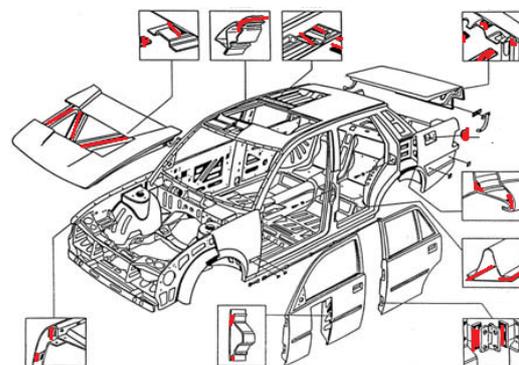


Figure 2. Glued joints of the car body

By using the bonding technology we avoid these problems and we can take advantage of the many advantages it offers in the automotive industry. Such as the possibility of new assembly

procedures, reduction of the resulting weight of the car, preservation of the protective layer of zinc, higher strength and rigidity of the body, high quality of appearance of the parts to be joined and substantial reduction of noise in the car body.

It also has number of complications with the use of bonding technology in car body construction. For example, the adhesive must be overpainted, due to production, short time intervals to cure the joint, the adhesive life must be longer than that of a car, the adhesive must have sufficient strength, the shrinkage of the adhesive during curing on the car body surface.

The nature and composition of the adhesives used to build the car body is always firmly linked to the desired function of the joint. In this way, the adhesives can be divided into strength, reinforcement and sealing. Strength adhesives cure together with body paint. The edge adhesives are partially cured by induction heating during assembly, but full hardness is achieved only during the curing of the varnish by high temperatures in the furnace. The designer currently has a choice of many types of adhesives with different mechanical properties, ranging from tensile to brittle behavior. In the automotive industry, we are particularly interested in strength adhesives.

3 Use of FEM analysis for weld joints

The finite element method (FEM) is a method, which is widely used in engineering and mathematical modeling. Principle of This method is numerical solving of differential equations. The most used utilization areas for this method the traditional fields of structural analysis, heat analyses, fluid flow, mass transport, and electromagnetic potential. The FEM is generally a numerical method, which solves partial differential equations in two or three space variables. FEM solving process consists of subdivision of large system into many smaller and simpler parts, which are called finite elements. Software reaches this subdivision by discretization of a particular space in a given area or space dimensions. Result of such discretization is creation of a mesh on such object. Created mesh has finite number of elements of equal size, hence the name finite element method. FEM then defines a boundary value problem in a algebraic equations system. The method approximates the unknown function over the domain. [19]

In this work, a finite element approach based on Solid Works software is used to simulate strength of laser welded joint. Simulations are carried out for every combination of four materials.

3.1 Creation of the weld joint model

Geometrical model was made to be identical to pull test. The first step was to make a 3D volume object of o sheet metal plate with dimensions 100x25x0.8 mm (Fig.3).

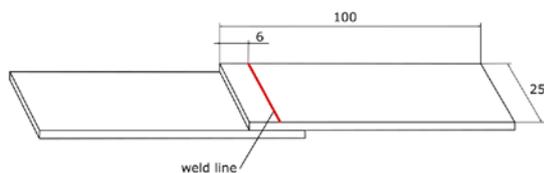


Figure 3. Sketch of welded plates with dimensions

Then, split lines were created to represent weld line and divide line, which define area attached to the test machine and machine arm. Attached area is 30mm of sheet metal length and full sheet metal width (Fig.4). This model was then transformed to sheet metal part, which represents it by a midplane in a FEM analysis. Fem analysis was carried out in assembly, where 2 sheet metal were aligned properly and mated.



Figure 4. 3D model of sheet metal plate

Simulation type was chosen to be static. Both sheet metal plates were checked their definition by shell manager. After making sure plates are defined as mid planes, connections were set. In connection settings, the global contact was set to no penetration and lap weld was defined by the edge weld situated on a weld line (Fig.5).

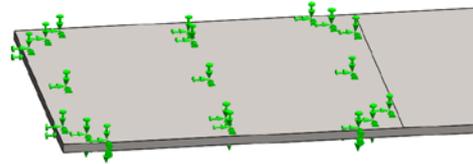


Figure 5. Fixed side of sheet metal plate

For fixtures, the command fixed geometry was set on the faces created on one metal plate, simulating attachment to the test machine. Fixed geometry fixes movement in any direction and rotation around any axis (Fig.6).

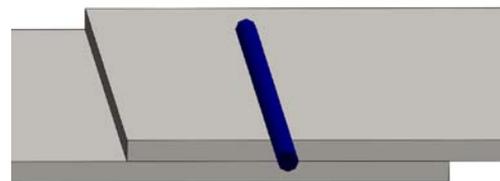


Figure 6. Weld spot and representation

For external loads simple command force was defined just like fixture, but on the second metal plate (Fig.7). Force was placed on both sides of metal plate and amount of force was set to total which distributes force on both sides equally. One of the last settings for simulation was to set materials to each sheet metal plates, which will change later in the simulation according to simulated pair of sheet metal plates.



Figure 7. Pulled side with applied force

Meshing has a big impact on results of the FEM analysis. Sheet metal plates will be represented as mid planes, which means mesh will be drawn as 2D. Solid Works is capable to draw only tree point entities and given the intricate dimensions of sheet metal plates, the meshing was difficult to define. To erase or minimize any local maximums (stress). With this in mind the mesh parameters were set to 5.408 mm for global size and 0.27 mm for tolerance (Fig.8). This setting made negligible difference to local maximum in node to other values in close proximity nodes.



Figure 8. Sheet metal pair with mesh

Applied force for sheet metal pair was constantly changing according to examined pair materials. At the start the theoretical numerical values for lap weld were computed for each material, which are F_e force for yield strength of the weld joint and F_m for ultimate strength of the weld joint (Table.2). Force F_e represents the maximum theoretical force, which can be applied to reach the yield strength. F_m is analogical to F_e but for ultimate strength. These values were then applied in FEM analysis for each material used in pair of sheet metal plates.

Table 2. Computed forces with material properties

Material	Re	Fe (N)	Rm	Fm (N)
HX340LAD	414	8280	473	9460
TL1550-220	292	5840	373	7460
HCT600X	346	6920	654	13080
DC04	197	3940	327	6540

After application of Fe and Fm the last thing to get from the Fem analysis was the force, which would be destructive for the weld and it would snap. Thou Solid Works do not dispone of such function to make a plot for maximum force until the weaker material breaks, the workaround had to be made. This workaround was composed of two parts. First part was driven by new result plot, which was factor of safety plot (Fig.9). If this factor of safety is set to be 1 for the weakest material in a pair. This means that the applied force is exactly at yield strength. If the factor of safety is anything else than number one, the force must be multiplied by the lowest factor of safety value. Second step was to determine coefficient between ultimate strength and yield strength by division. Multiplication of this coefficient and force for factor of safety equal to one gives the force load under which the weld joint breaks.

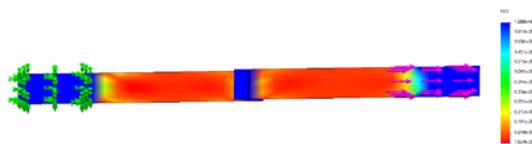


Figure 9. Factor of safety for TL-TL pair

3.2 Results of FEM analysis

Results gained by the FEM analysis are shown In Table 3.

Table 3. Simulation results for sheet metal plates combinations

Combination of materials (fixed – pulled sheet)	Loaded by Fe for pulled sheet (MPa)	Loaded by Fe for fixed sheet (MPa)	Loaded by Fm for pulled sheet (MPa)	Loaded by Fm for fixed sheet (MPa)	Force when weld breaks max F (N)
TL-TL	295.967	295.967	372.977	372.977	7359.5429
TL-HX	419.625	295.967	479.427	378.068	7360.4713
TL-HCT	350.701	295.967	662.886	378.068	7360.0309
TL-DC	199.677	295.967	331.443	378.068	6492.8157
HX-HX	419.625	419.625	479.427	479.427	9332.8498
HX-HCT	350.701	419.625	662.886	479.427	9332.8498
HX-DC	199.677	419.625	331.443	479.427	6492.8157
HCT-HCT	350.701	350.701	662.886	662.886	12905.6504
HCT-DC	199.677	350.701	331.443	662.886	6492.8157
DC-DC	199.677	199.677	331.443	331.443	6452.6495

According to the gained results, it is quite noticeable that force until weld break, for same material pairs, is quite similar to the computed theoretical force for a given material (obr. 10). The theoretical force is greater than analysis one. This variance can be caused by the difference in theoretical model, which was computed in a way that did not included torque, just linear propagation. In simulated model however, this additional torque was taken into account, which lowered the final value.

For the other combinations of materials the force was heavily reduced by weakest one from the pair, which was carried out across all simulated pairs, hence TL-DC, HX-DC, HCT-DC have the same value (Table 3).

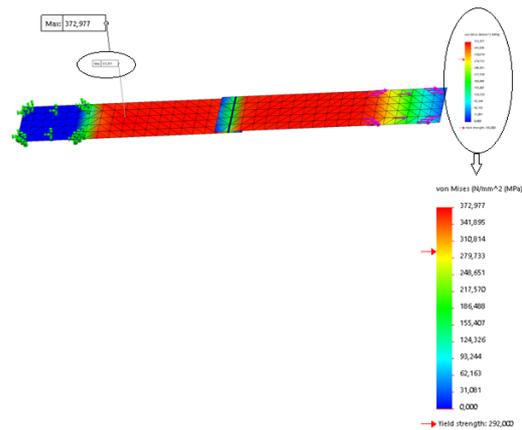


Figure 10. Example of FEM analysis for a pair of TL -TL materials

4 Use of FEM analysis for glued joints

Knowledge of the behavior of glued joints is essential for their subsequent application in practice. For effective prediction of the properties of glued joints it is necessary to use suitable tools allowing to accurately model various modes of failure that may occur in the structure. The failure of glued joints includes the area from the beginning of loading to the initiation of the crack, followed by the area of development of the failure.

The possibility of numerical simulation of the glued joint is the main requirement for its successful design. If a suitable numerical method was found, it would be possible to replace a large part of the glued joint experiments with this simulation. This would lead to a reduction in the times involved in the development, production and production cost of the product.

The simpler tools offered by FEM analysis allow you to model only the area from the beginning of the load to the initiation of damage. The principles of linear elastic fracture mechanics apply in this area. The behavior in this area is described by the cohesive stiffness of the adhesive layer. The failure initiation state occurs at a critical value of the stress at the crack front. In the FEM model, this state describes the tension between the nodes of an idealized adhesive layer caused by their critical displacement and critical load.

Elements commonly available in FEM analyzes can be used to idealize the adhesive layer. Their behavior is described in terms of material parameters, which in some cases can be obtained from glue producers, but more often it is necessary to find out more difficult by means of experiments. Specifically, the adhesive layer can be replaced by contact, 3D elements, 2D

elements, a linear spring system, or simply replacing the adhesive, such as the SSG element in Siemens NX or the TIE element in Abaqus.

The first step is to create a CAD model. This model is then converted into a preprocessor, which converts the geometric model into the form necessary for the calculation itself. In this phase, the main task is to create an adequate computer network and to define the initial conditions correctly. The preparation of the whole calculation model follows the rules that each company creates itself and must be strictly observed. The rules are set to achieve a compromise between computational complexity and result accuracy.

The next step is to load the file into the solver and start the calculation itself. The calculation is started using the command line and follows the mathematical operations described above. The results are written to files during the calculation.

The last step is to load and process the results in the postprocessor. The postprocessor allows viewing the simulated process, plotting acceleration, stress, strain and many other variables depending on the selected variable.



Figure 11. 2D plain strain finite element model of bonded joint

In recent years, models using the so-called cohesive joint model have been used in the research of glued joints. The cohesive Model can be used to model adhesives, bonded surfaces, seal models, patches, or delamination processes (Fig. 11). The cohesive model must be implemented in the numerical model of FEM analysis.

4 Conclusion

The effort of the car manufacturer is to produce cars of the lowest possible weight, which in practice means a reduction of materials of different thickness and quality, whether metallized or unplated, but also for the connection of ferrous and non-ferrous metals. Their use in the automotive industry opens up new opportunities for designers. These consist in the optimal use of the properties of different types of sheets, which can be combined into one unit and thus affect the strength, stiffness or corrosion resistance and resistance to chemical aging.

One of the many conditions is that the car must guarantee a prescribed level of passive safety, which is tested under predetermined conditions. At present, we are still looking for possibilities and technologies that would mean cheaper, faster and more accurate production of cars, while maintaining the conditions and criteria required by us. These technologies undoubtedly include computer design of cars. Everything is done on computers from designing, designing individual components, to demanding strength calculations and simulating vehicle barrier tests. In all calculations and simulations, the aim is to bring the computational model to reality as much as possible. Simulation by finite element method of the glued and welded joints allows to reduce the time for product development, production and production costs.

Literature:

1. Walame, M. V., Ahuja, B. B.: *Profile modification of adhesively bonded cylindrical joint for maximum torque transmission capability*. International Journal of Modern Engineering Research, 2013. 4/ 8, p. 1-11.
2. Kohl, D. et al.: *Influence of manufacturing methods and imperfections on the load capacity of glued-in rod*. Journal of Adhesion, 2020. Volume: 96 Issue: 8, p. 738-759.

3. Miková, L. et al.: *Motion control of nonholonomic robots at low speed*. International Journal of Advanced Robotic Systems, 2020. Volume: 17 Issue: 1, p. 1-12.
4. Babjak, Š. et al.: *Lean creative automotive product design (LCAPD)*. A Jövö Järmüve, 2012. Vol. 5, no. 3/4, p. 70-78.
5. Sivak, P. et al.: *Influence of Different Strain Hardening Models on the Behavior of Materials in the Elastic-Plastic Regime under Cyclic Loading*. Materials, 2020. Volume: 13 Issue: 23, p. 1-20.
6. Yang, XH, Zou, L., Deng, W.: *Fatigue life prediction for welding components based on hybrid intelligent technique*. Materials science and engineering A-structural materials properties microstructure and processing, 2015, Volume: 642 Pages: 253-26.
7. Kopas, P. et al.: *Fatigue characteristics of welded high strength steel in the low cycle region of loading*. MATEC Web of Conferences, 2019. Volume: 254, p. 1-10.
8. Sapietova, A. et al.: *Dynamic and Stress Analysis of a Locking Mechanism in the Ansys Workbench Software Environment*. Advances in science and technology – research journal. 2019, Volume: 13, Issue: 1, p. 23-28.
9. Medvecká-Beňová, S.: *Strength analysis of the frame of the trailer*. Scientific Journal of Silesian University of Technology: Series Transport. 2017, Vol. 96., p. 105-113.
10. Hassanieh, A. et al.: *Glued-in-rod timber joints: analytical model and finite element simulation*. Material and Structures, 2018. Volume: , 51 Issue: 3, p. 1 – 10.
11. Homišin J, et al.: *Electronic Constant Twist Angle Control System Suitable for Torsional Vibration Tuning of Propulsion Systems*. Journal of Marine Science and Engineering. 2020, Voume 8, no 9:721, pp. 1-17.
12. Medvecká-Beňová, S. et al.: *Material properties of rubber-cord flexible element of pneumatic flexible coupling*. Metalurgia. 2015. Vol. 54, no. 1, pp. 194-196, ISSN 0543-5846.
13. Kuric, I. at al.: *Technical diagnostics at the department of automation and production systems*. 2019, Advances in Intelligent Systems and Computing , Volume: 835, p. 474-484.
14. Juzek, M. et al.: *Non-Parallelism of Toothed Gear Shafts Axes as a Source of Gear Housing Vibration*. Transport Means - Proceedings of the International Conference, 2017, p. 601-606.
15. Abadi, S. M. A. Noori Rahim, et al.: *Effect of shaped laser beam profiles on melt flow dynamics in conduction mode welding*. International journal of thermal science, 2021. Volume: 166, p. 1-12.
16. Maláková, S. et al: *Meshing Stiffness-A Parameter Affecting the Emission of Gearboxes*. Applied sciences, 2020. Volume: 10/23, p. 1-12.
17. Chang, F. B. et al.: *Study on laser welding of dual phase steel*. Metalurgja, 2021. Volume: 60, Issue: 3-4, p. 365-367.
18. Vasko, M. et al.: Comparison of FE analysis and experimentally obtained data for the identification of residual stresses in welded high-strength steel. MATEC Web of Conferences, 2019. Volume 254, p. 1-9.
19. Daryl L. Logan: *A first course in the finite element method*. Cengage Learning. 2011, ISBN 978-0495668251.

Primary Paper Section: J

Secondary Paper Section: JO, JQ, JR, JT



PAPERS PUBLISHED IN THE JOURNAL EXPRESS THE VIEWPOINTS OF INDEPENDENT AUTHORS.
