ELECTRONIC EDUCATION AND ONLINE TEACHING AT SLOVAK UNIVERSITIES DURING THE COVID-19 PANDEMIC

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Abstract: The comprehensive education system in 2020 was significantly limited at all levels by the global pandemic of the coronavirus SARS-CoV-2. Universities modified the organization of teaching and transformed study into cyberspace, so teaching could continue in a distance form using e-learning, webinars, or other digital education tools. The paper focuses on the issue of university education during the first wave of the pandemic and has the character of a theoretical-empirical study. The first part presents the basic theoretical background of the researched issue from the perspective of various authorial approaches. The key is the empirical part, in which the results of research conducted among students are interpreted to find out their experiences, attitudes and preferences in the context of online teaching during the COVID-19 pandemic. The research involved 730 respondents from sixteen Slovak universities. In conclusion, the author appeals to the importance of digital and media literacy so online teaching can be considered an effective and equivalent tool to the full-time form of study.

Keywords: COVID-19 pandemic, education, information and communication technologies, online teaching, students, teachers, preferences, research.

1 Introduction

The year 2020 was marked by radical changes in the functioning of all areas of life. The cause of these socio-political, cultural, and economic changes was the emergence of a global pandemic of the coronavirus SARS-CoV-2, which affected all continents and every individual. It is obvious that these changes also affected the field of education and the organization of the educational process itself. As a result of the constant spread of the coronavirus, schools and educational institutions on all continents have been closed. Education has transformed dramatically – with a significant increase in e-learning and other forms of distance learning, which is implemented at distance and on various digital platforms.

For more than 300 million students worldwide, the learning process is disrupted by a pandemic. Neither schools nor universities have encountered a similar situation for generations, but unlike in the past, we are now able to continue our education even when schools are closed. With the spread of the COVID-19 pandemic, there has been an increasing shift towards online learning, as it represents the only option for a continuous learning process. Informal and non-formal education is also particularly affected. However, there is a firm presumption that no pedagogical approach can replace the top position of formal education and direct teacher interaction. However, because of the COVID-19 crisis, online education has begun a pedagogical shift from the traditional method to a modern teaching approach, from classroom to Zoom, from personal to virtual contact, and from seminars to webinars. In the pre-pandemic period, e-learning, distance learning and courses were popularly considered part of non-formal education, but at present it seems that if circumstances persist for a long time, these forms will gradually replace the formal education system. One can only agree with Lederman's (2020) standpoint that, because of the COVID-19 crisis, both teachers and students have found themselves forced to accept digital academic experience as a summum bonum of the online teaching and learning process.

Therefore, the main aim of this paper was to find out what are the experiences, attitudes, and preferences of students at Slovak universities in the context of online teaching carried out in the first wave of the pandemic in the summer semester of the academic year 2019/2020.

2 Digitization and use of information and communication technologies in the educational process

How is it possible to define the educational process? The educational process should inform (educate), shape (tutor) and should also have an instrumental function. According to M. Bošnáková (2006), that refers to the international pedagogical terminology of UNESCO IBE Educational Thesaurus 1991, the educational process is one *"in which a pupil (educant) and a teacher (educator) enter into communication contact for the purpose of transmitting information"*. In the educational process, a complex personality is formed with the help of acting educational elements, that uses the acquired skills, knowledge, and habits as a tool for:

- obtaining information from any sources of information;
- internal, thoughtful processing of information;
- use in practice at the current time, in the current context and conditions.

In this context, we can also mention E. Petlák (1997), who specifies what skills students should develop in the educational process:

a) ability to learn (planned, systematic and organized);
b) remember the subject matter (repeat, practice, sort ...);
c) think logically correctly, accurately and thoroughly (analyse, synthesize, deduce ...);
d) observe things and phenomena (capture the essence, objectively assess, use observation techniques ...);
e) approach the facts creatively (actively acquire knowledge, organize work ...).

At the same time, the author says that *"the ideal is no longer a student as a "living encyclopaedia", but a capable and creative person who can use, combine and supplement the knowledge he has acquired or is acquiring creatively."*

Z. Obdržálek (2000) adds that the teaching process can be described as a dialectical, contradictory, complex multifactor and conflicting event, which develops based on causal links, while it is goal oriented. It includes the teaching activity of the educator and the learning activity of the pupil, i.e., two partial processes between which a certain tension takes place and whose roots lie in the opposite relationship between the educator's leadership and the educant's independence.

The expansion of science and technology supports efforts to modernize the goals, content, and forms of the educational process itself. The maturity, development, and breadth of application of modern means of information and communication technology are becoming one of the basic criteria for the success of the society. It is therefore clear that education and the educational process are significantly influenced by the state of development of information and communication technologies (ICT). We identify with the statement of Kozik et al. (2016) that *"today's society is adopting an education strategy that is based on teaching supported by information and communication technologies"*.

The currently achieved level of ICT allows their use in every phase of the teaching process (e.g., motivational, fixative, etc.). Their application brings certain advantages to the educational process, but also disadvantages. We define the specific aspects in the following table.

Table 1: Advantages and disadvantages of implementing ICT in the educational process

ADVANTAGES	DISADVANTAGES
Active motivation of learners.	A more superficial perception of the teacher's presentation by students.
Interactivity, given the possibility of direct entry of the student into teaching.	Preparation of teachers to teach is time consuming.
A constructivist approach to acquiring new knowledge. Student does not acquire the finished knowledge but must work on it themselfs.	Creating a presentation for a teacher for one lesson seems ineffective from his/her point of view.
Supporting the creative approach of learners to the tasks or gaining knowledge.	Possible failure of technology or connection failure during classes.
Quick feedback on students' level of knowledge.	

Source: KOZÍK, T. et al.: *Vzdialené experimenty v edukácii.* Nitra: Univerzita Konštantína Filozofa v Nitre, 2016, p. 17-18.

It should be emphasized that the implementation of ICT in the teaching process does not mean the displacement of classical forms of education, but the contribution of *a new quality* of the educational process.

There are many opinions on what exactly means the use of information and communication technologies in the field of education. According to V. Stoffová (2001), information technologies are at the most general level methods, procedures and ways of collection, storage, processing, verification, evaluation, selection, distribution, and timely delivery of the necessary information in the required form and quality. D. Vasiľová – J. Alcnauer (2001) state that it is a set of technologies used in the processing of information systems (word processors and spreadsheets, e-mail, laptops, communication management, marketing databases, mobile data communications, corporate intranets, calls via computer, geographic infosystems or the Internet / www).

We agree with J. Kalaš (2000) that ICT uses computing and communication tools that support teaching, learning and other activities in the field of education in various ways. In this context, he understands ICT as technologies related to the collection, recording and processing of information. To do this, they use:

- traditional media such as television, video and radio;
- personal computers with multimedia support;
- input and output devices, means for digitization, reading, control and measurement;
- the Internet and its services;
- integrated educational programs (i.e., complex computer environments focused on learning);
- means for videoconferencing;
- electronic and programmable toys;
- automatic sensors, recorders, and devices for automatic data evaluation.

J. Průcha, E. Walterová and J. Mareš (2001) characterize new technologies in teaching as modern means of didactic technique, didactic programs and new forms of teaching inspired by them. These include in particular:

- networks (local computer networks, online libraries and other sources of information, e-mail, videoconferencing in distance education, business education, etc.), on various media (e.g., CD-ROM);
- multimedia, which combines different forms of data storage (video, hypertext, two- and three-dimensional animations, etc.);
- mobile devices and approaches supporting flex schooling and wireless LAN networks, laptops, systems enabling education, "just in time" learning, etc.

In this context, E. Fulková (2004) formulated several changes that are a consequence of the implementation of ICT in educational processes as follows:

- improve the conditions for access to the curriculum;
- act as part of classical teaching;
- allow easier and better understanding of the curriculum;
- increase attention and reduce student fatigue;
- cause a change in teaching methodology;
- increase the motivational effect;
- enable more effective repetition, consolidation and deepening of the curriculum;
- increase the degree of systematic nature of teaching;
- improve clarity and others.

A significantly positive pedagogical aspect is the possibility of self-education, interactivity, feedback information and practicing the necessary skills according to the individual needs of the student. At the same time, the use of ICT in education also increases pupils' information and digital literacy. Shortcomings include weak social contact with the educator or various technical failures and limitations. Generally, information and communication technologies facilitate the transition from theory to practice and can help increase the effectiveness of education. The most well-known forms of education using ICT include, e.g., e-learning, m-learning, webinars, or electronic conferences.

Due to the presence of the aggressive disease SARS-CoV-2, the year 2020 offered the possibility of absolute implementation of information and communication technologies into the educational process and their massive use. It was the only way to continue teaching at all levels of study. Several advantages and disadvantages of this form of education have been proven both on the part of teachers and on the part of students. However, the real impact on education and students will only be discussed later.

3 The main aim and methodology of the research

The main aim of this paper was to examine the experience of Slovak university students with online teaching during the first phase of the COVID-19 pandemic, based on theoretical background and empirical research.

In examining these contexts, we decided to use a quantitative research strategy because it results in diverse data. The basic tool of quantitative research was a self-designed questionnaire, which contained several questions of various natures. Methods of analysis, synthesis, comparison, as well as data generalization or their graphical representation were used in the evaluation and interpretation of research results. Since the research was exploratory (we examined the organization and course of online teaching, student preferences, subjectively perceived advantages and disadvantages of online teaching in the context of a coronavirus pandemic), we did not formulate hypotheses in this case, but based on a comparison of professional literature and previous research on given issue, we formulated several assumptions. For the purposes of this paper, the following assumptions are topical:

1. We assume that most respondents prefer the method of live lectures in real time in online teaching during the COVID-19 pandemic.
2. We assume that most respondents consider the absence of contact with a teacher to be the biggest disadvantage of online teaching during the COVID-19 pandemic.
3. We assume that most respondents report a problem with concentration during online teaching.

We analysed the obtained data, evaluated them, and drew certain conclusions and opinions, which we present in the next chapter of the paper.

4 Interpretation of research results

The first part of the questionnaire was devoted to the demographic data of the respondents (gender, university affiliation). The research was attended by 730 respondents – students at Slovak universities. In total, students from 16

universities in Slovakia participated in the research. In the following graphic overviews, we present the identification data of the respondents from the research sample.
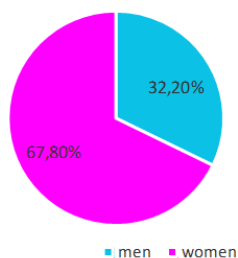

Graph 1: Age of respondents
Source: own processing
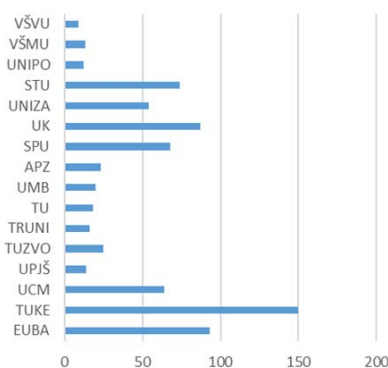
Graph 2: Number of students and affiliation to the university
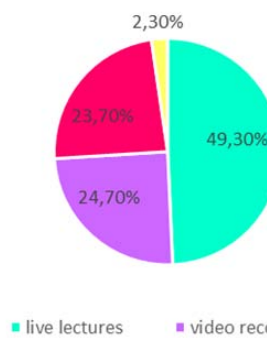Source: own processing

At the beginning of the questionnaire, we asked students how teaching is organized at their school during the COVID-19 pandemic. In this question, respondents had the opportunity to mark several answers. Almost 73 % of respondents said that most of them only receive documents in the form of lectures or other teaching materials via e-mail. The second most frequent alternative is the organization of live teaching in real time through live lectures and seminars. Approximately one third of the respondents stated that the teaching is carried out through video recordings (e.g., on YouTube) and 13.2 % of the respondents also marked the option of teaching only in an auditory form – the teaching is recorded on audio recordings that are made available to students. Interestingly, 11 % of all respondents said they did not have any online classes and teaching was not replaced or provided in any specific way.
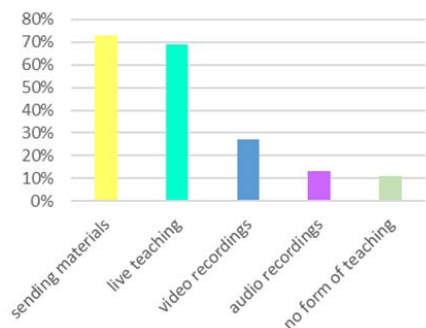
Graph 3: A method of online teaching organization
Source: own processing

In Question 4, we asked the respondents which of the mentioned options of distance education organization they prefer the most. Almost half of all respondents are inclined to live teaching – hence, in real time. Approximately a quarter of respondents (23.7 %) prefer teaching exclusively by sending study materials,

assignments, or presentations, and 24.7 % of respondents prefer video recordings. According to the research sample, the least attractive form of online teaching is teaching only through audio recordings, to which only 2.3 % of respondents admitted. These results are understandable, as it is in audit teaching that other important forms of perceptions are absent – especially visual ones, which are extremely important in the study. They strongly support concentration and other cognitive processes, especially the process of memorizing information that can be considered key and strategic in learning. In this context, it can be stated that Assumption 1, that *most respondents prefer the method of live lectures in real time in online teaching during the COVID-19 pandemic* has been partially confirmed.


Graph 4: Preferred method of online teaching
Source: own processing

In the following part of the questionnaire, we investigated how students most often communicate with teachers and through which platforms online teaching is implemented at their university. For both questions, students had the opportunity to mark multiple answers. By far the most dominant form of communication has become e-mail communication between the student and the teacher, approximately one-fifth of the research sample also prefers a video call, e.g., via Skype. Less than 6 % of respondents also use more personal contact for communication through telephone calls, most often when consulting final theses or other assignments and term papers.

According to the research sample, the most frequently used online communication platform is the Microsoft Teams platform, which is used by almost 64 % of students, the second most popular is the e-learning software Moodle, which use approximately 49 % of respondents. Frequently used platforms include Zoom (16.6 %), Google Hangouts (11.8 %), Skype (11.2 %) and Webex (2.2 %). A few students stated that online teaching is also implemented through YouTube, Outlook, the academic information system AIS, Discord or Facebook.

In research, we were also interested in which form of teaching students generally prefer. Although at first glance it might seem that online teaching will be more popular, the results of the research showed that more than 60 % of respondents do not prefer this method and, conversely, they lean towards the classic full-time form of teaching. We also asked respondents if they would like teaching to take place online only in the future. The answers pleasantly surprised us, as up to 79 % of respondents clearly stated that they would not prefer such a possibility. Regarding the intensity of study during online teaching, most respondents answered that they study less than during the classic semester during full-time teaching. About a quarter of respondents feel that they study with the same intensity and level both online and in full-time teaching. Almost a third of students show a higher level of study intensity in the online form, which was a surprising finding.

Another aim of our study was to find out what are the most common advantages and disadvantages that respondents perceive in connection with online learning during the COVID-19 pandemic. For both questions, they had the opportunity to mark several answers. The biggest advantages of this form of

education are considered by students to be the fact that teaching is carried out from home and they do not have to travel for education (71.4 %). Related to this is the fact that almost 67 % of respondents also see economic benefits in distance education – saving on food, accommodation, transport, etc. Approximately 60 % of respondents also consider some form of time flexibility to be a benefit, e.g., that they can watch the recording of the (video) lecture at a time of their choice. More than half of the students stated that they also considered the fact that there is no need to get ready, use make-up and the like to be an advantage. Almost 23 % of respondents also consider the acquisition of new digital skills and knowledge regarding the use of platforms and digital tools for online learning to be positive. According to some students, online learning has no benefits and is difficult for them to study in such way. The biggest surprise, however, was the result, in which 51 % of respondents mentioned the great advantage of online teaching to be the fact that in addition to learning, they can do several other things (watch series, listen to music, etc.). This possibility clearly cannot be considered a positive, as the learning process should not be disrupted by other influences. This digital and media multitasking leads to a lower level of concentration, memorization of knowledge, impaired thinking, or other problems in the context of education.
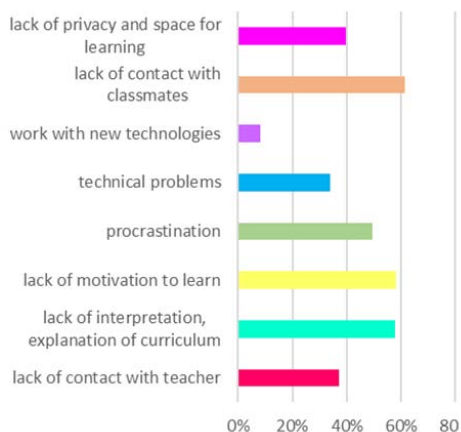
Graph 5: Disadvantages of online learning
Source: own processing

Graph 5 presents the disadvantages that students perceive in the context of online teaching during the COVID-19 pandemic. According to most students, the biggest disadvantage of distance education is the absence of social contact with classmates, which was indicated by 61.5 % of respondents, insufficient contact with the teacher is negatively assessed by almost 38 % of students. Students also consider the lack of motivation to learn to be a significant problem, which was supported by more than 58 % of respondents. In addition to weak social contact with peers, respondents also have a negative perception of online interpretation or insufficient explanation as well as understanding of the study topic (57.7 %), or of procrastination, which is experienced by almost half of the entire research sample. About 40 % of students said that the weakness of online learning is the fact that they do not have enough privacy and space to concentrate when learning from home – they are often disturbed by various stimuli (other household members, other responsibilities determined by parents, etc.). One third of respondents also report technical problems, such as a bad internet signal, poor connection or poor sound or video quality, and less than 9 % of respondents also consider the fact that they have to learn to work with new programs, technologies or other platforms through which online teaching is implemented, as negative. Approximately one percent of all respondents believed distance learning has no disadvantages. Within the "Other" category, students most often stated that online study is much more difficult, especially in cases where they do not understand the lectured curriculum, they also negatively assess teacher readiness, lack of study materials but also the fact that laboratory exercises are replaced by theoretical lectures and practice is

absent. Based on these results, it can be stated that Assumption 2, that *most respondents consider the absence of contact with a teacher to be the biggest disadvantage of online teaching during the COVID-19 pandemic* was not confirmed.

At the end of the questionnaire, we were interested in the respondents' opinion on selected statements related to online education in the context of the pandemic – we asked to what extent they agree with the submitted statements.
Statement 1: *I have more trouble concentrating in online teaching than in full-time teaching.*
Statement 2: *I achieve better results and evaluation in online teaching than in full-time teaching.*
Statement 3: *My teachers have adapted well to online teaching.*

The results in this context yielded interesting data. More than 66 % of the research sample agrees with Statement 1, thus identifying with the results of other more general research. These clearly show that the impact of digital technologies on the learning process is tangible and has negative consequences. Especially in the context of the specifics of cyberspace and digital media and thus a new type of rhizomatic thinking, problems with concentration on lectures or assignments are often mentioned in connection with learning. In this context, it can be stated that Assumption 3, that *most respondents report a problem with concentration during online teaching* was confirmed.

Related to this are the results of expressing agreement or disagreement with the second statement, which applies to the learning outcomes of online teaching during the COVID-19 pandemic. Only less than a third of the research group said that the evaluation and results of the study are better for them especially during online teaching. However, almost 70 % of respondents do not agree with this statement. Therefore, it can be stated that the distance method of online education does not, according to students, have a sufficiently motivating effect on their study results.
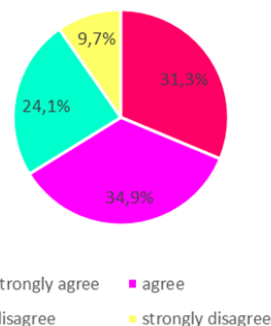

Graph 6: I have a problem with concentration
Source: own processing
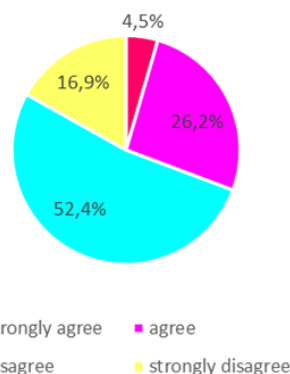
Graph 7: My performance and grades have improved
Source: own processing

In the last statement, we wanted to know the opinion of students on the readiness and adaptation of their teachers to the online teaching process. Almost 60 % of respondents said that teachers were able to adapt to the new conditions and adapted well to online teaching. However, approximately 11 % of students are of the opinion that the process of modifying the educational process was not sufficient and do not agree that teachers have sufficiently adapted to the virtual environment and distance learning.
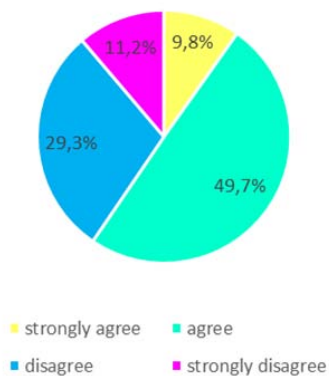
Graph 8: Teachers have adapted well to online teaching
Source: own processing

5 Conclusion

Due to its severity and abruptness, the SARS-CoV-2 coronavirus pandemic is described as the greatest global health crisis in centuries in human civilization. It can be confirmed that its rise destroyed everything from world economies to social rituals and partially halted and later specifically transformed the educational process.

Global disruption of education can often pose a greater threat to most children and students than the virus itself. The presence of COVID-19 in the future will directly and permanently change education, as it is necessary to be able to adapt to work and study online for any reason and situation. The paper presents the opinions, attitudes, and preferences of students regarding the implementation of online teaching, while it was clearly confirmed that respondents prefer direct contact with the teacher, full-time teaching, and social contact with classmates. When evaluating the adaptation to online teaching and study administration, only 43 % of students stated that their university was able to adapt to the new situation very well or excellently.
However, it can be clearly stated that only time will show whether online lessons are an effective and sufficient substitute for full-time teaching. Since education can be considered as one of the basic pillars of societies, in conclusion we can only appeal to increase digital and media literacy on the part of both students and teachers so that the process of education in the online environment can be perceived as effective, beneficial, and sustainable.

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